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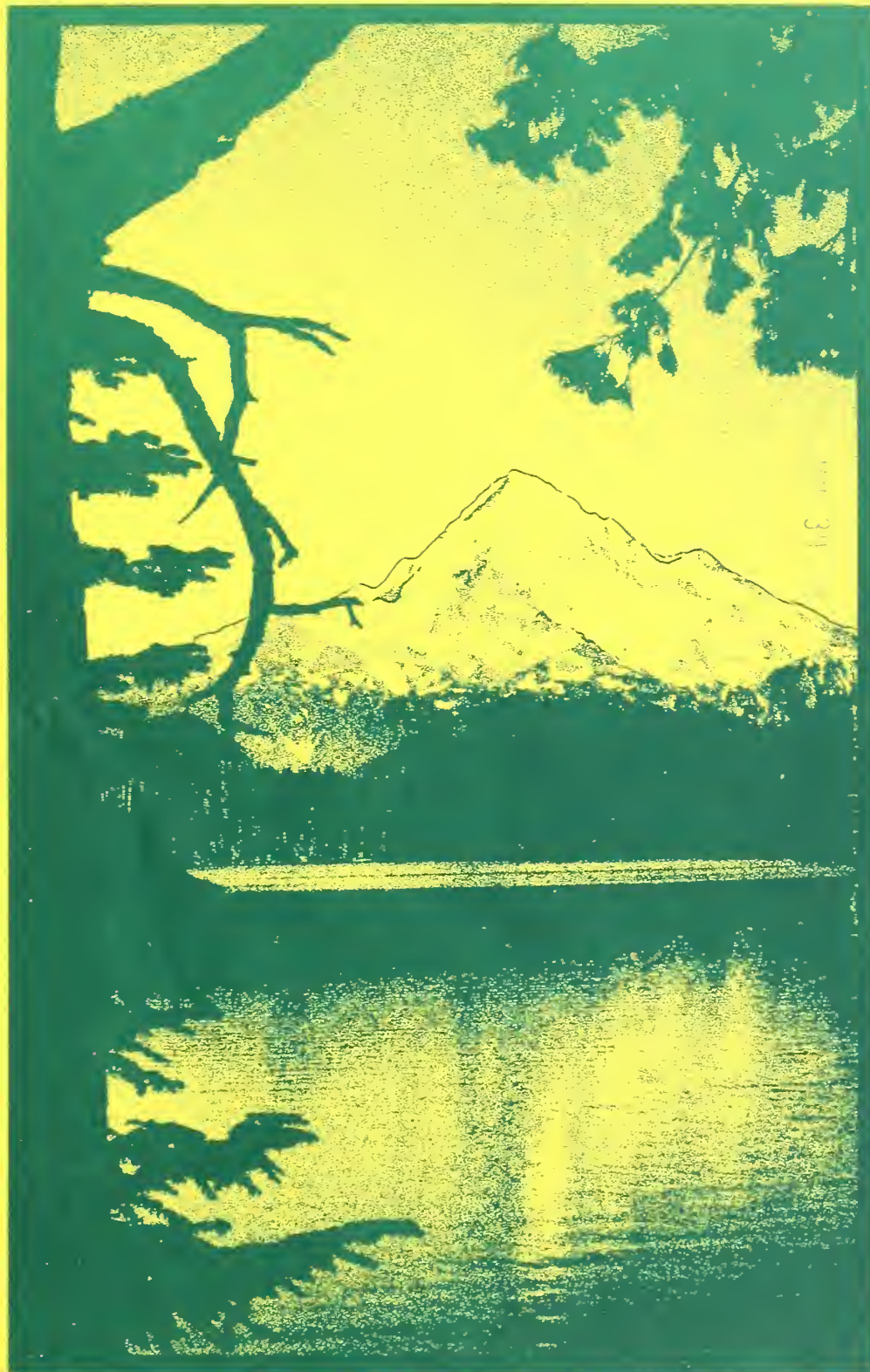
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THE LPK TIMBER SALE PLAN FOR 1979-84:

A draft environmental statement of the 5-year operating plan,
part of the long-term sale of Tongass National Forest timber to
the Louisiana-Pacific Corporation, Ketchikan Division



THE LPK TIMBER SALE PLAN FOR 1979-84. U.S. Department of Agriculture,
Forest Service, Alaska Region, Tongass National Forest, Ketchikan Area.
December 1978, Series No. R10-47.

U.S.D.A. FOREST SERVICE ENVIRONMENTAL STATEMENT

LOUISIANA-PACIFIC, KETCHIKAN DIVISION, TIMBER SALE
1979-84 OPERATING PERIOD

USDA-FS-R10 DES Adm 01 (79)

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Summary

This is a draft environmental statement published by the U.S. Department of Agriculture, Forest Service. It describes an administrative type of action.

The action proposed is the harvesting of 960 million (feet) board measure (MM bm) of timber on the north end of Prince of Wales Island and on Revilla Island, which are part of the Tongass National Forest in Alaska. Timber, fish, wildlife, water, and outdoor recreation opportunities are all important resources on the sale area. The harvesting of timber and associated activities is part of the existing 50-year Timber Sale Agreement between the United States and Louisiana-Pacific Corporation, Ketchikan Division.

The five alternatives considered are:

1. Harvest 960 MM bm of timber on the sale area in the units proposed by the Louisiana-Pacific Corporation, Ketchikan Division (LPK).
2. Harvest no timber.
3. Harvest 794 MM bm of timber on the sale area and emphasize forest values other than timber.
4. Harvest 960 MM bm of timber on the sale area from units proposed by the Forest Service interdisciplinary team (IDT).
5. Harvest 685 MM bm of timber on the sale area in currently roaded areas and avoid entering all roadless areas larger than 5,000 acres.

Alternative 4 is preferred by the Forest Service. It meets the policies of the "Southeast Alaska Area Guide" for resource protection, avoids sensitive roadless areas, and satisfies the contractual commitment for timber volume.

Timber harvesting in the sale area would convert old-growth stands to young, faster growing trees. Naturalness and aesthetic qualities of the area would decrease. Wildlife habitat would be modified by clearcutting and roads. Wilderness characteristics would be lost in areas where timber harvesting and related activities are planned.

Comments on this draft environmental statement have been requested from the following Federal, State, and local agencies and others: Advisory Council on Historic Preservation, Washington, D.C.; U.S. Department of

Commerce; U.S. Department of Housing and Urban Development; U.S. Department of the Interior; U.S. Department of the Army, Corps of Engineers; U.S. Department of Transportation, Federal Highway Administration; U.S. Environmental Protection Agency; U.S. Department of Energy, Federal Energy Administration; U.S. Department of Commerce, National Marine Fisheries Service (Juneau, Alaska); State of Alaska, Office of the Governor, State-Federal Coordinator; State of Alaska's Departments of Community and Regional Affairs, Highways, Commerce and Economic Development, Environmental Conservation, Fish and Game, Natural Resources, Public Works, and Law; Alaska State Historic Preservation Officer; City of Ketchikan; City of Craig; City of Klawock; and Greater Ketchikan Gateway Borough. Others invited to comment include the Alaska Loggers Association, Tongass Conservation Society, Western Forest Industries Association, Arctic Representative of Friends of the Earth, Southeast Alaska Conservation Council, Alaska Lumbermen's Association, Ketchikan Chamber of Commerce, Alaska Miners Association, Sealaska Corporation, Citizens for Management of Alaska Lands, The Wilderness Society, Sierra Club, South Tongass Land Review Committee, and other interested individuals.

Contents

	Page
I. INTRODUCTION	1
II. AFFECTED ENVIRONMENT	4
A. Physical	4
1. Geography	4
2. Climate	4
3. Soil	5
4. Water	6
B. Biological	7
1. Flora	7
2. Fauna	8
C. Social Aspects	11
1. Recreation	11
2. Visual	13
3. Wilderness	14
4. Cultural	14
5. Transportation	15
D. Economic Aspects	19
E. Land Status	22
F. Issues	22
G. Management Concerns	23
III. EVALUATION CRITERIA	24
IV. ALTERNATIVES CONSIDERED	25
V. EFFECTS	27
A. Soil	27
B. Water	29
C. Fish	33
D. Wildlife	37
E. Vegetation	43
F. Timber	44
G. Socioeconomic	46
H. Minerals	48

	<i>Page</i>
I. Recreation	48
J. Wilderness	52
K. Visual	52
L. Cultural Resources	54
M. Atmosphere	56
VI. EVALUATION OF ALTERNATIVES	56
VII. IDENTIFICATION OF FOREST SERVICE PREFERRED ALTERNATIVE	59
VIII. MANAGEMENT REQUIREMENTS	60
IX. CONSULTATION WITH OTHERS	61
X. REFERENCES	63
XI. GLOSSARY	65
XII. APPENDIX	
A. Timber Sale Contract A10fs-1042	
B. Operating Guidelines	

Tables

	Page
TABLE 1--Recreation cabin use on sale area in 1976	11
TABLE 2--Average annual employment by industry in southeast Alaska, 1970-76	20
TABLE 3--Average employment by industry in the Ketchikan Area, 1970-76	21
TABLE 4--Primary employment by sector and Area on the Tongass National Forest	19
TABLE 5--Extent of stream miles affected by on the sale area by timber harvest alternatives	32
TABLE 6--New and reconstructed log transfer facilities by alternative	36
TABLE 7--Percentage of natural cover types believed necessary to maintain near natural or acceptable levels of wildlife populations	37
TABLE 8--Relative effects on individual species or species groups by alternative	42
TABLE 9--Size of acres to be harvested by alternative on the sale area	44
TABLE 10--Locations which have high value for dispersed primitive recreation and are proposed for entry by alternative	51
TABLE 11--Locations which have high value for dispersed semiprimitive recreation and are proposed for entry by alternative	51
TABLE 12--Relationship of alternatives to evaluation criteria	59

The LPK Timber Sale Plan For 1979-84

I. Introduction

This draft Environmental statement (DES) evaluates alternatives for the harvest of 960 million board measure (MM bm) of timber on Tongass National Forest lands in southern southeast Alaska. The harvest will occur over a 5-year period starting July 1, 1979, and ending June 30, 1984. The preferred alternative would have the activities take place on the northern portions of Prince of Wales and Revillagigedo Islands as part of the 50-year timber sale agreement between the United States and Louisiana-Pacific Corporation, Ketchikan Division (LPK). (See Alternative maps for the boundary of the sale.)

This DES was considered necessary because some previously unroaded and undeveloped areas of the sale area must be planned for timber harvest prior to completion of the Tongass Land Management Plan (TLMP). The Tongass Land Management Plan, which was fully coordinated with the Roadless Area Review and Evaluation (RARE II) process, will assign various land use designations to the Forest ranging from Wilderness to development of the natural resources on the Forest. 1/

The interdisciplinary team (IDT) preparing the DES for the 50-year sale coordinated their plan with TLMP and RARE II so as not to contain any publicly expressed Wilderness proposals. This meant leaving options open to TLMP by remaining on the primary sale area and by deferring harvest in Karta, Salmon Bay Lake, and those portions of Sarkar and Honker Divide roadless areas that are within the long-term sale area. Implementation of the LPK Long-Term Sale for the 1979-84 operating period will not begin until July 1, 1979, well after the TLMP and RARE II processes are scheduled for completion.

1/ TLMP and RARE II assessments were released in June 1978 through draft environmental statements. The TLMP draft may be obtained by contacting the Regional Forester's Office, USDA Forest Service, P.O. Box 1628, Juneau, Alaska 99802. The RARE II draft may be obtained from any Forest Service office.

Section 15(a) of the National Forest Management Act validated existing timber sale contracts made with the Forest Service. This section of the Act also directed the Secretary of Agriculture to revise the long-term sale contracts in Alaska to make them consistent with the guidelines and standards provided in the Act and to reflect such revisions in the contract price of timber. The Act further states, however, that any such action shall not be inconsistent with valid contract rights approved by the final judgment of a court of competent jurisdiction. In conformance with this law, the Government is making revisions in the contract which will affect activities after July 1, 1979. The harvest unit selection process for the 1979-84 operating period is occurring according to existing contract requirements. The preferred alternative follows the guidelines and standards of the Act.

The 50-year term of the sale has been divided into a series of 5-year operating periods for purposes of redetermining rates of payment. Two years in advance of each 5-year operating period, the purchaser selects logging units for cutting in the ensuing 5-year period. The Forest Service then has 1 year to review the purchaser's selections and request modifications necessary to prevent damage or protect the national forest. There is then, 1 year left to cruise and appraise the selected units so that new rates for stumpage and road construction can be established.

The Timber Sale was Sold July 26, 1951, and is scheduled to terminate June 30, 2004. During this time the Forest Service must make available 8,250,000,000 board feet of timber (see contract section 1, Appendix A). The Forest Service SHALL make up to 960 MM bm available in each 5-year period if the purchaser requests. If this volume is not available on the primary sale area, it must be made up from the remainder of pulpwood allotments E, F, and G, which include essentially the remainder of Prince of Wales and its associated islands, Revilla Island, Cleveland Peninsula, and the Ketchikan Area mainland.

The interdisciplinary process described in the "Southeast Alaska Area Guide" was followed in preparing this DES. A study plan was prepared and the IDT selected in June 1977.

In 1976 and throughout 1977, Forest Service and LPK crews reconnoitered the sale area to determine specific areas feasible for development. Information was gathered by use of aerial photographs, maps, and aerial and ground reconnaissance missions. Data were gathered on the physical factors which affect the management of natural resources primarily concerning vegetative and terrain features.

From these investigations, LPK proposed its selection of units under the contract and submitted them for Forest Service approval. This proposal ultimately became Alternative 1. The IDT team met and reviewed the LPK proposal and developed Alternatives 3 and 4. Additional field reconnaissance was conducted by team members to investigate various aspects of Alternatives 1, 3, and 4. These investigations supplemented previously gathered data.

Alternatives 2 and 5 were developed last by the core team. They reflect national concerns for roadless recreation.

The IDT included the following individuals:

Edward Johnson	Team Leader, FS
Jim Rhodes	Engineer, FS
Paul Harrington	Wildlife Biologist, FS
Ed Blankenship	Forester, FS
Dave Loggy	Soil Scientist, FS

Additionally, the following specialists advised the team in the development of Alternatives 3 and 4 as well as the analyses of Alternatives 1, 2, and 5.

Mike Pease	Fisheries Biologist, FS
John Short	Landscape Architect, FS
Steve Hæavig	Alaska Dept. of Fish and Game
Bob Wood	Alaska Dept. of Fish and Game
Chuck Osborne	U.S. Fish and Wildlife Service

Others also provided professional advice and assistance throughout the development of this DES, including:

Keith McGonagill	Logging Systems, FS
Stan Davis	Archeologist, FS
Chris Rabich	Archeologist, FS
Doug Campbell	Landscape Architect, FS
Duane Peterson	National Marine Fisheries Service
Dana Young	Soil Scientist, FS
Darl Enger	Engineer, FS
Louis Bartos	Hydrologist, FS

This was done basically at the prescriptive level of planning as described in the "Southeast Alaska Area Guide." Prior to release of any unit for timber harvesting or roading, an IDT review will be required.

II. AFFECTED ENVIRONMENT

Following is a brief discussion of the environment of the sale area. In many aspects it is the same as much of the rest of southeast Alaska. A more detailed description, relative to each of the following topics, can be found in the "Southeast Alaska Area Guide," the "Tongass Land Management Plan," and the series "The Forest Ecosystem of Southeast Alaska," numbers 1 through 10 (see references).

A. Physical

1. Geography

The geography of the sale area is characterized by completely glaciated islands within the Alexander Archipelago. Deep fiords and bays are prevalent through the many intricate waterways. The primary sale area is bounded to the west and south by the Pacific Ocean and by Sumner Straits, Clarence Straits, and Behm Canal to the north and east. The uplands consist of steep mountain ranges dissected by glaciated valleys of varying widths. Elevations range from sealevel to about 4,000 feet. No glaciers are present within the area, but some perpetual snow patches exist in some of the higher mountains.

2. Climate

All of southeast Alaska is in the humid maritime zone (Miller). The sale area has over 1,000 miles of ocean shoreline. A few offshore islands separate the western coast of Prince of Wales Island from the open Pacific Ocean.

Strong winds are frequent, especially from mid-September to mid-May, but they may occur in any month. More than 80 percent of the total yearly precipitation falls during these months. The more severe storms are often accompanied by winds in excess of 50 miles per hour. However, precipitation intensities are not severe. The expected maximum 1-hour precipitation is 1 inch for a 100-year storm and 0.8 inch for a 25-year storm.

The average temperature for the coldest month is slightly above 32° F, and the average temperature for the warmest month is below 60° F. Rainfall is high, averaging over 100 inches per year at sealevel. The maximum summer day length is 17.5 hours at nearby Ketchikan. Cloudiness is

the rule. For example, the percentage of possible sunshine throughout the year is 27 percent at Annette near the southern end of the Forest and 23 percent at Juneau near the north end.

The average length of the growing season at Hollis is 177 days, but the average air temperature during this time is below 55° F. Evapotranspiration is estimated to be 23 inches at Craig and at Hollis.

Thus, the climate is mild with cool temperatures, high humidity, and high precipitation. In winter, snowfall is generally light along the beaches, but a deep snowpack accumulates inland and at higher elevations.

3. Soils

Most mineral soils of southeast Alaska have several characteristics common to northern coniferous forests. These include thick organic mats, ranging from a few inches to over a foot in thickness. These mats are largely responsible for the soils being totally resistant to sheet erosion and highly resistant to other types of erosion so long as these mats are not removed. Other common characteristics include very strong acidity, low natural fertility, extremely rapid infiltration rates, rapid permeability in their upper layers, perpetual moistness, and very low bearing strength. They also are thixotropic, meaning they tend to change state from a solid to a gel when agitated. These latter three characteristics have a marked influence on excavation and use of the soils for various engineering purposes, especially roadbuilding. Nearly all road embankments have to be built from rock blasted from quarries. Only a few soils from fresh glacial and alluvial deposits are worthwhile for embankment purposes.

Because of these soil characteristics, sheet erosion problems are minor. However, soil mass movement resulting from steep slopes and/or unstable soils is a major soil management problem. Currently, these problems are dealt with mainly by avoiding or minimizing activities on such areas. Should significant new logging systems or other advanced logging technologies be applied in the future, it is likely that some soils or slopes, otherwise avoided because of soil management problems, may become available for the harvest of timber and road construction.

4. Water

The sale area has 30 major streams and numerous small, largely unnamed streams. The watersheds are generally small, ranging from a few hundred acres to a few thousand acres. There are a few larger ones, such as Staney Creek (46,000 acres) and Thorne River (96,000 acres), but most are short with irregular characteristics of early stage development.

Stream flow fluctuates widely, with peak flows occurring in the fall and spring and low flows in the summer and winter.

Most stream patterns are dendritic or rectangular. Streams usually originate in the alpine or high muskegs and flow down steep bedrock control V-notches. Along valley floors, they may cut through deep, compact till deposits or follow faults and joints in the bedrock.

In spite of the abundant amount of precipitation in this region, groundwater is generally scarce. Through rapid soil percolation and drainage and high water tables in some soils, the majority of the precipitation is rapidly returned to the ocean by the large number of streams in the area.

Any land use activity that might reduce water quality must be carefully controlled. Many watershed problems are associated with landforms or slopes where geologic erosion and sediment production are naturally high. These areas are frequently sensitive to such activities as logging and road construction. Water temperature and flow may also be affected by land management practices.

The Forest Service is conducting an extensive water quality monitoring program. The State of Alaska, Department of Environmental Conservation, is revising its water quality standards and developing best management practices (BMPs) for control of nonpoint source pollution. Administrative control and implementation of watershed protection measures are increasing through hydrologic and fisheries input to the planning process.

On May 24, 1977, the President issued Executive Order 11988 directing that development on flood plains be avoided where there is a practical alternative and Executive Order 11990 which provides similar direction for protection of wetlands.

Some stream crossings in the sale area have abutments and fill material on land that meets the Flood Plan Definition in the Executive Order. Other than this, there are no facilities planned on flood plains. Under the selected alternative, the number of stream crossings have been minimized to the extent practical.

It is not surprising that southeast Alaska with its high rainfall (100-200 inches per year) impervious substrata and frequent rainfall (30-40 percent) has an abundance of wetlands. Technically, wetlands as defined in Executive Order 11990 constitute about 30 percent of the landscape within the bulk of the sale area.

Wetlands (muskegs) commonly occur on slopes up to 30 percent. Wetlands are present on all landforms except the steepest mountain slopes. Consequently, there is no practical alternative to avoiding all of them. The sensitive wetlands of southeast Alaska are the tide influenced meadows in the estuarine zone. No development is planned in the selected alternative on these lands. All roads will unavoidably cross some wetlands in places.

B. Biological

1. Flora

The major floral associations of the sale area are true forest grass-sedge meadows, muskegs, and alpine tundra.

The true forest is part of the cool, very moist rain forest that extends from northern California to Cook Inlet. It extends from sealevel to an altitude of 2,000 to 3,000 feet. This forest is comprised primarily of western hemlock and Sitka spruce, with a scattering of mountain hemlock, western redcedar, and Alaska cedar. Red alder is common along streams, beach fringes, and on recently disturbed soils. Blueberries, huckleberries, copperbrush, devilsclub, and salal are the most important shrubs on the forest floor. Mosses grow in great profusion on the ground, on fallen logs, and on lower tree branches.

Grass-sedge meadows are usually small areas around streams at low elevations and on the upper intertidal areas. Vegetation consists mainly of grasses, sedges, and other herbaceous plants.

Openings occupied by muskegs, or bog plant communities dominated by sphagnum mosses and sedges are dispersed throughout the forest. These openings also support low shrubs, forbs, and a few scattered hemlocks and lodgepole pines. Muskegs vary greatly in size from small pockets, where drainage has been retarded, to relatively broad expanses, such as portions of the Thorne River Valley. Muskegs may even occur on fairly steep slopes. The underlying substrate is highly organic and ranges from about 1.5-feet to 40-feet thick. These openings create variety in the unbroken coastal forest and add to its value as wildlife habitat. Shrubs growing at the edge between the forest and muskeg provide further habitat variety.

The alpine tundra usually lies above 2,500 to 3,000 feet. Thus, it occupies the region above the coastal forest and is separated from the forest by a subalpine or transition zone. Soils are generally thin, but gravelly and stony organic soils may form locally in depressions. Snow remains in some glacial basins year-round, particularly on north-facing slopes. Resident plants have adapted to snowpack and wind abrasion by evolving low-growth forms. Low, mat-forming vegetation covers most of the tundra, and cushion-like plants occupy crevices on exposed rock outcrops and talus slopes.

None of the plant species threatened or endangered in Alaska are known to occur within the sale area.

2. Fauna

Fish and wildlife resources of the sale area are major commercial, subsistence, recreational, and aesthetic assets. The commercial and sport fisheries depend upon the forest ecosystem to provide spawning and rearing habitats as well as a quality source of freshwater entering the estuarine environment.

Salmon, char, and trout are the fish species most dependent on the forest environment. Salmon are also the mainstay of the southeast Alaska fishing industry. In terms of wholesale value, canned and frozen salmon accounted for 72 percent of the value of all fish product for 1970-76.

Seven species of anadromous salmonids occur on the sale area. Of these, four species are of commercial value. These are the pink, chum, coho, and sockeye salmon. The coho and pink salmon are also of major recreational importance.

Three sport fish species, in addition to the coho salmon, occur within the sale area. These are steelhead or rainbow trout, cutthroat trout, and Dolly Varden char. Both resident and anadromous forms of these species occur in the area. Several of the major stream systems on the sale area are known for their recreational steelhead fishing. Also, many lake systems contain suitable sport fish populations of cutthroat trout. Cutthroat trout and Dolly Varden also occur as resident populations in small isolated stream reaches.

Detailed field development of the Fish Habitat Management Units (FHMU) will not be made at this time. However, they will be identified during implementation planning prior to release of units. There are six sub-FHMUs that are descriptive of typical habitat situations encountered in the southeast Alaska forest and stream environments. These sub-FHMU overlap in many instances; therefore, prescriptions will be tailored to each situation encountered.

These typical sub-FHMUs are:

- *Pink and chum salmon spawning streams.

- *Coho salmon and steelhead trout spawning and rearing streams.

- *Dolly Varden and cutthroat trout spawning and rearing streams.

- *Potential fish habitat for commercial and sport fisheries populations.

- *Nonfish habitat.

- *Temperature sensitive streams.

Estuarine areas also provide significant contributions to the fisheries resources of the sale area. Emergent pink and chum salmon fry depend entirely upon estuarine food

supplies for growth and survival. Estuaries also are important nursery areas for several commercial species of crab and shrimp.

The long-term sale area furnishes the necessary habitats and niches for over 250 vertebrate wildlife species. Some of the major land types or wildlife habitats include alpine areas, muskeg forests, muskegs, spruce-hemlock forests, estuarine grassflats, rock outcroppings, freshwater lakes, saltwater lagoons, and intertidal areas. The spruce-hemlock forest is the largest, making up over 56 percent of the land area, of which 85 percent is in the climax old-growth type. This old-growth climax forest represents an essential component of the habitat requirements of many of the wildlife species or species groups. The existing habitats include a mixture of uneven-age timber stands in mixed volume classes, giving varying degrees of crown closure, tree species composition, opening size, varying composition of dead trees (snags), and understory vegetation, thus providing varied habitats and niches.

Each of the more than 250 species of wildlife have varying social significance. Populations of wolves and bald eagles create a national awareness or concern for wildlife. Game species, primarily the Sitka black-tailed deer, contribute to a regional and local sport and subsistence hunting need which, in turn, contributes to the socio-economic well-being and lifestyle of many residents. The attraction of wildlife also adds to a successful tourism industry equally valuable to the region.

None of the animals listed on the U.S. Department of the Interior's U.S. Fish and Wildlife Service list of endangered and threatened species are known to exist on the sale area.

Several sources provide a more complete discussion of the fish and wildlife resources and related management problems. These include the "Fish and Wildlife Specialists Reports," "Wildlife Task Force Report," "Fisheries Task Force Report," and "Socioeconomic Overview."

C. Social Aspects

The social situation on the sale area is constantly changing. Examples of this change in the last 5 years are the Ketchikan-Hollis ferry connection; road connections from Hollis to Craig, Thorne Bay, and Naukati Bay; a new logging camp at Labouchere Bay; and establishment of a sawmill in Klawock. Each of these changes has, in some way, changed the lives and lifestyles of many residents of the sale area and vicinity.

Since Thorne Bay and Naukati have been connected to the public road system, Craig has become a shopping area for these communities. The people are forming intercommunity social ties, and the communities have begun cooperating to achieve mutually beneficial projects, such as State highways, power facilities, and community fairs. Similar development is expected as Whale Pass, Coffman Cove, and Labouchere Bay are connected in the future.

1. Recreation

In the long-term sale area, recreation use is concentrated in the Barnes Lake-Sweetwater Lake area, Karta River-Salmon Lake area, Thorne Bay-Stanley Creek road system, Salmon Bay Lake, Sarkar Lakes, Port Protection area, Hollis, Red Bay, Traitors Cove, and Behm Canal area. A list of recreation cabins in the sale area and their use for 1976 is displayed in table 1.

TABLE 1--Recreation cabin use on the sale area in 1976

Recreation cabin	:	Visitor days of use
	:	
Red Bay Lake	:	30
Salmon Bay	:	160
Shipleigh Bay	:	78
Barnes Lake	:	96
Sweetwater	:	242
Sarkar Lake	:	60
Stanley Creek	:	182
Salmon Lake	:	320
Karta Lake	:	790
Karta River	:	660
McGilvery Creek	:	266
Blind Pass	:	240
Plenty Cutthroat	:	234
Marguerita Bay	:	542

For inventory purposes, recreational opportunity were divided into three broad categories: Dispersed primitive, dispersed semiprimitive, and concentrated.

Dispersed Primitive--Recreational pursuits involving isolation and an appreciation of the natural environment. They provide a high degree of challenge and risk, and they require a high degree of self-reliance and outdoor skills. Major activities include fishing, hunting, backpacking, and watching or photographing wildlife. Nature is met on its own terms without convenience facilities, except for access by water or air.

Opportunities for dispersed primitive recreation are abundant because of the large amount of roadless area and the small number of users. According to inventories of the recreation opportunity done for TLMP, several areas on the sale area rated high and moderate in quality for dispersed primitive recreation.

Dispersed Semiprimitive--Recreational pursuits require a moderate to high degree of self-reliance and basic outdoor skills. Activities are often oriented toward the taking of fish, wildlife, and edible plants. The natural environment dominates, but some modifications for human conveniences are allowed. Rudimentary roads or trails, as well as airplane and small boat access, may be available.

Opportunities for dispersed semiprimitive recreation are abundant because of the large amount of relatively undeveloped forest land, air and water access, primitive trails, both public and special-use cabins, and old logging roads. In TLMP inventories, several areas on the sale area rated high and moderate in quality for dispersed semiprimitive recreation.

Concentrated--Recreational pursuits include group learning and structured activities, such as downhill skiing and organized sports. (A moderate to high level of sport skills is required.) Although the natural environment is important, modifications for comfort, convenience, and participation are emphasized.

National forest lands surrounding communities are often highly suitable settings for concentrated recreation and provide good potential for facility development. However, opportunities for concentrated recreation are the least

abundant of the three major types, primarily because large numbers of users are necessary to justify the expense of development. Consequently, those developments that do exist are found near urban centers, such as Ketchikan. In TLMP inventories, most of the sale area rated low in quality for concentrated recreation.

Further details concerning recreation are in the "Recreation and Visual Resource Specialists Report" and the "Recreation/Wilderness Task Force Working Report, TLMP."

2. Visual

The sale area encompasses two of the Characteristic landscape types of southeast Alaska--the Kupreanof Lowlands and the Coastal Hills.

The northern half of Prince of Wales Island is almost entirely in the Kupreanof Lowland character type. Much of the landscape is characterized by a low, rolling terrain, except for the blocky mountains between Luck Lake and Thorne Bay and the range of more angular peaks around Shakan Bay, El Capitan Pass, Shipley Bay, and Devilfish Bay.

The major water feature in this part of the sale area is the West Coast Waterway extending from Shakan Bay in the north to Tonowek Bay in the south. Included within this main channel are many bays, narrow channels, and island groups. Other major water features are such bays as Port Protection, Red Bay, Salmon Bay, Whale Pass, and Thorne Bay; the Sarkar Lakes and Sweetwater-Barnes Lake systems; and three major stream systems--Thorne River, Karta River, and Staney Creek.

Intricate channels and island groups and extensive tidal flats are generally the features that make up the most diverse landscapes on this portion of Prince of Wales Island. The highest rated landscapes in terms of variety of features in this area of Prince of Wales Island are the Salmon Bay and Calder Mountain areas. Most of the remainder of the sale area on Prince of Wales Island is a more common landscape with respect to the Kupreanof Lowland character type.

The portion of the sale area on the northwest corner of Revilla Island is part of the Coastal Hills character type. The landscape is primarily characterized by very steep slopes and moderately rugged terrain surrounding Traitors Cove, Neets Bay, Gedney Pass, and Shrimp Bay.

Past logging and roading activities changed the character of the landscape to differing degrees in various areas of the sale area. In the Sarkar Lakes, Salmon Bay, Salmon Bay Lake, Honker Divide, and Karta River areas, there has been virtually no change in the character of the natural landscape. But, in the areas around Thorne Bay, Coffman Cove, Stanley Creek, and Whale Pass, the natural landscape as seen from recreation use areas has been extensively altered by large clearcuts.

In between these two extremes are areas where the natural landscape, as seen from key viewing areas, has been only slightly altered by management activity. These would include areas as seen from portions of the West Coast Waterway, Sumner Straits, Red Bay, and Sweetwater Lake.

In other areas, such as Traitors Cove and Neets Bay, the natural landscape has been extensively altered in the past. However, 20 to 25 years of regrowth have partly restored the forested texture and green color to the landscape.

3. Wilderness

No portion of the sale area is classified as Wilderness. The Karta River drainage area is currently included in several bills before the U.S. Congress.

RARE II and TLMP studies have evaluated the wilderness potential on all roadless areas on the sale area. Some public interest has been expressed for Wilderness for Karta, Salmon Bay Lake, Honker Divide, and Sarkar. Therefore, alternatives have been developed to satisfy contractual volumes for the 1979-84 operating period without entering these areas. This was done so as to not constrain the RARE II and TLMP processes.

4. Cultural

The sale area was traditionally occupied by the Tlingit Indians with the exception of southern Prince of Wales

Island, which was inhabited by the Haida Indians. Although detailed studies have not been undertaken to find all sites of past Indian occupancy, over 50 known sites are on the sale area. These include villages, canoe landings, middens, fish weirs, forts, petroglyphs, and burial sites. Many more sites are likely to exist, but most of them are covered with a dense growth of vegetation.

Since late in the 1700's, Euro-Americans have had contact with Natives in southeast Alaska. Evidence of early activities on the sale area is primarily from mining and prospecting activities late in the 1800's and early in the 1900's. Also, early in the 1900's salteries and later canneries were built to utilize the fishery resource. Remains of these can be found in many bays on the sale area. Logging also started in the 1900's, and evidence of this early occupation can also be found scattered throughout the sale area.

5. Transportation

The present transportation system in the sale area involves air, land, and water travel. The principle waterways are Sumner Strait, Clarence Strait, Behm Canal, and El Capitan Pass. Land access routes are confined to localized systems on the individual islands, and in most cases the individual island systems cannot be linked by land. Thus, transportation of goods and people generally requires combined land and water or air transportation means.

Prince of Wales and Revillagigedo Islands contain the greatest population centers. The other islands contain temporary logging camps with localized road systems primarily for timber harvest.

Revillagigedo Island is occupied by Ketchikan, Saxman, Loring, and three small floating logging camps. Revillagigedo Island has an extremely difficult terrain that limits the integration of the existing road systems. Continued development will generally expand existing systems, with expansion directed toward local intraconnection only where feasible.

Prince of Wales Island contains six small communities and numerous logging camps with a population of about 2,300 people. A large portion of these are isolated with only

local road systems. Continued development has generally trended toward linking these systems. The terrain on Prince of Wales Island is favorable for development of an intraisland road system. Figure 1 shows the main road system (arterials and major collectors), existing and planned, on Prince of Wales Island. Past development has been accomplished by public works contracts, cooperative agreements, and timber sale developments.

Forest Service roads and State roads connect Craig, Klawock, Thorne Bay, and Naukati to each other and to Hollis on Prince of Wales Island. There are approximately 210 miles of main Forest Service road and 20 miles of State road terminating at these population centers. One objective of transportation planning has been to connect the isolated road segments radiating from Coffman Cove, Whale Pass, El Capitan, and Labouchere Bay to the other population centers and to encourage development of additional ferry terminals on Prince of Wales Island.

All roads on Prince of Wales Island, with the exception of the State roads, have been constructed primarily for timber harvest. The rate of construction and the time table for interconnecting segments depended heavily on the location of timber to be harvested and the location of log transfer terminals.

Forest Service policy by regulation is to construct roads to standards appropriate for the intended use, considering safety, cost of transportation, and impacts on lands and resources. Locally, the main roads (arterials and major traffic collectors) have been constructed to a single lane width with turnouts and with a rough shot rock surface but built wide enough to accomodate future crushed gravel surfacing. Bridges have generally been of temporary log stringer construction. All roads are designed for heavy off-highway loads, but only the main roads are intended to receive future surfacing for efficient log hauling and to accomodate low-clearance automobiles.

This type of construction is the result of economic limitations and a conservative approach to accomodating an unknown amount of future public traffic when there were very few connecting routes and mostly industrial traffic. The recent connections, however, of main roads between some of the communities and logging camps, plus the establishment of ferry service at Hollis in 1974,

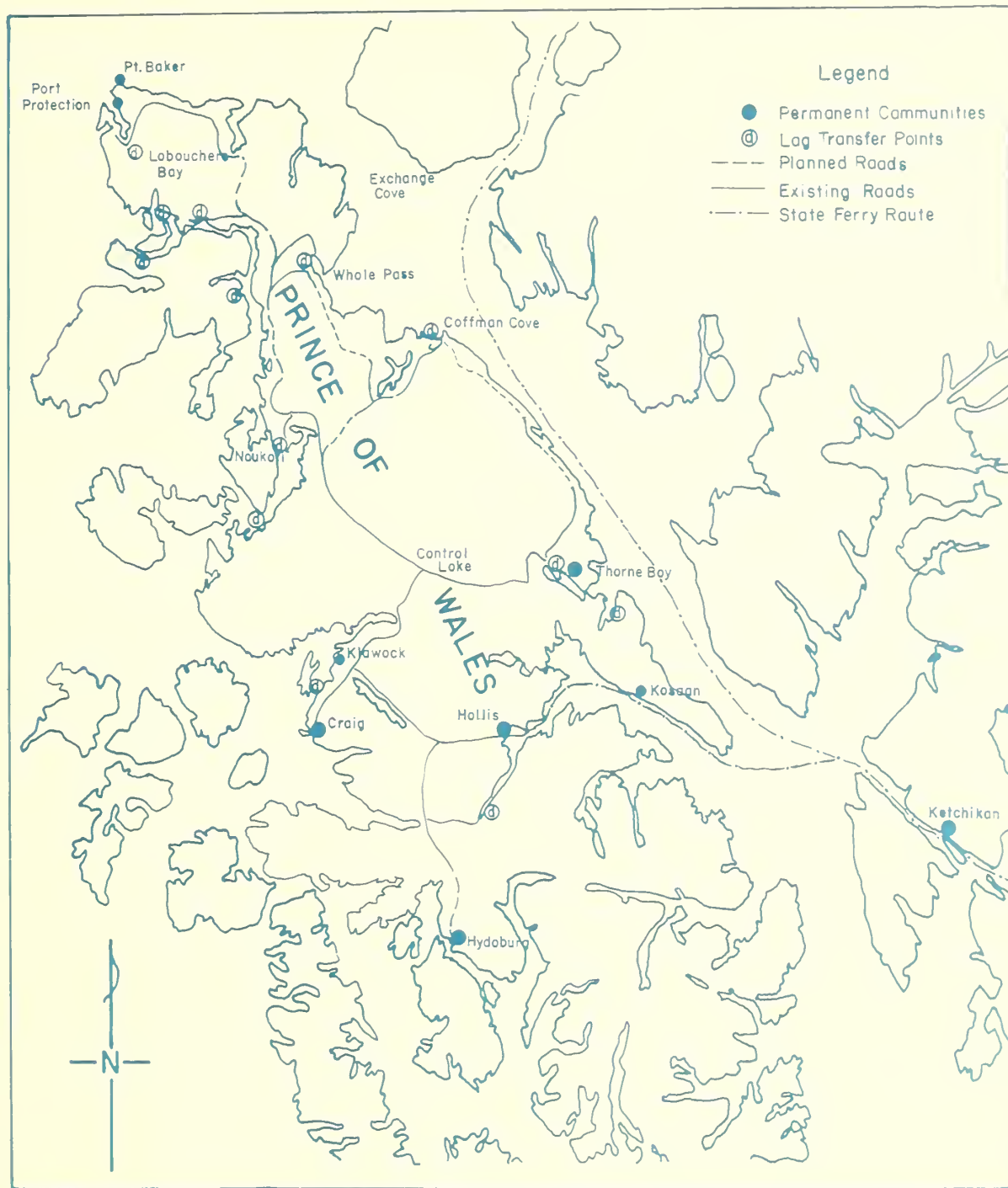
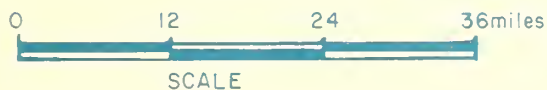


Figure 1 - Basic Transportation System
for
PRINCE of WALES ISLAND



have expanded public use on the main roads beyond the predictions of 5 years ago for the 1974-79 operating period.

Approximately 55 temporary log stringer bridges are in use on the Prince of Wales Island main road system. All but four of the temporary log stringer bridges on the Hollis-to-Thorne Bay route have been replaced by permanent bridges with public works funds. If the temporary bridges (8-10 year service life for loaded log trucks) are not replaced through the next 5-year period, load limit restrictions will be required and will close some routes to log hauling.

Currently, public use is restricted in the southern Stanley Creek area during periods of log hauling, which include most of the daylight hours from Monday through Saturday. The restrictions are applied because of inadequate width or numbers of passing turnouts and because logging traffic is on the roads during these times.

Future management for the Forest Development Roads will continue to emphasize connection of communities and logging camps by construction of the remaining nonplanned segments of the Prince of Wales Island main road system. Reconstruction of sections of existing main road systems, including temporary bridge replacements, will be required to accommodate log hauling or unrestricted public traffic. The construction schedule, road restrictions or closures, and road standards are affected by national policies, local needs, and the ability to finance. To the extent that financing is available, the following direction will be applied to the development of the transportation system:

- *Main road new construction will be limited to a single-lane width with a 25 mph design speed and constructed wide enough to accommodate crushed gravel surfacing. Permanent bridges on the main routes will be constructed initially to a two lane standard.

- *Main roads will be surfaced for log hauling savings and public traffic.

- *Public traffic will be restricted on isolated portions of the main roads under Forest Service jurisdiction as necessary for safety.

*Permanent bridges will be constructed initially on all main roads, as determined by available funds, environmental impacts on fisheries and water quality, and the need to maintain continuous traffic. Applying the same considerations on the local temporary road systems, permanent or portable bridges with permanent abutments will be constructed on some major stream crossings and, temporary log stringer or portable bridges will be built on the rest.

*The local temporary road systems will be constructed and managed for only industrial or administrative use, unless there is a need for other uses such as hunting or fishing. These routes will be closed to public use during log haul periods and will be either closed to all traffic or posted as "not maintained for public travel" when not needed for log haul. Closures or restrictions may be applied for a variety of other reasons, for example, to limit the impact of access on wildlife.

D. Economic Aspects

The relative structure of the primary sectors of the Ketchikan Area is shown in table 2. Data and discussion on nearby areas of southeast Alaska are included for comparison.

TABLE 4--Primary employment by sector and Area on the Tongass National Forest.

Type of employment	:Percentage of primary employment by Area			
	:	:	:	:Chatham
	:Ketchikan	:Stikine	:Excluding	:Only
	:	:	:Juneau	:Juneau
Commercial fishing and fish processing	: 17.1	64.2	31.0	1.8
Logging and forest products	: 53.4	26.7	56.5	---
State and Federal Government	: 18.8	1.7	4.8	87.3

The socioeconomic situation in southeastern Alaska is described at length in the "Socioeconomic Overview" published by the Alaska Region, Forest Service, USDA, in 1978 as part of the

TABLE 2--Average annual employment by industry in southeast Alaska, 1970-76

Type of employment	Number of jobs during --							Percentage of total
	1970	1971	1972	1973	1974	1975	1976	
	Annual average							
Primary:								
Commercial fishing	1,375	1,210	1,330	1,490	1,690	1,340	1,590	6.5
Fish processing	732	566	762	703	638	636	662	3.1
Contract construction	--	75	472	581	461	285	368	1.5
(estimated major public works) 1/								
Federal Government	1,667	1,562	1,284	1,345	1,364	1,282	1,325	6.4
State government	2,258	2,434	2,627	2,716	2,941	3,252	3,432	12.8
Logging	1,079	1,114	1,201	1,444	1,467	1,230	1,076	5.6
Lumber	560	517	521	639	697	506	515	2.6
Pulp	1,003	995	1,002	1,011	1,295	1,187	1,178	5.0
Log and timber product transportation	125	120	120	130	120	90	100	.5
Tourism	480	540	600	670	740	830	920	3.1
Subtotal	9,279	9,132	9,919	10,729	11,413	10,638	11,167	47.1
Induced:								
Federal Government	1,182	1,086	1,138	1,119	1,175	1,265	1,239	5.4
State government	696	774	890	870	963	1,049	1,012	4.1
Local government	1,842	2,082	2,384	2,431	2,531	2,797	2,938	11.0
Contract construction (local) 1/	601	568	589	655	611	607	593	2.8
Distributive industries	5,206	5,533	6,105	6,355	6,994	7,576	7,656	29.6
Subtotal	9,527	10,043	11,106	11,430	12,274	13,294	13,438	52.9
Total employment	18,806	19,175	21,025	22,159	23,687	23,932	24,605	100.0
Total population	42,565	43,346	44,772	46,417	50,232	50,438	51,172	---
Participation rate	44.2	44.2	47.0	47.7	47.2	47.4	48.1	46.6

1/ Primary contracted construction employment estimates for major public works. Induced (local) employment is difference between total reported employment and estimated primary employment.

TABLE 3--Average employment by industry in the Ketchikan Area, 1970-76

Type of employment	Average number of jobs during --							Percentage of total
	1970	1971	1972	1973	1974	1975	1976	
Primary:								
Commercial fishing	340	270	420	375	475	280	285	350
Fish processing	129	89	235	172	179	131	118	150
Contract construction	--	--	125	237	192	104	141	114
(estimated major public works) 1/								
Federal Government	334	304	292	307	325	312	305	311
State government	240	240	240	240	240	240	240	240
Logging (including road construction)	494	547	634	780	810	591	596	636
Lumber	2/244	2/247	2/280	346	308	149	214	255
Pulp	2/535	2/541	2/537	2/586	2/789	2/651	2/620	609
Log and timber product transportation	70	70	70	75	70	50	60	66
Tourism	150	160	180	200	220	240	260	201
Subtotal	2,536	2,468	3,013	3,318	3,608	2,748	2,839	2,932
Induced:								
Federal Government	251	205	220	225	250	274	282	244
State government	219	248	302	286	332	349	298	291
Local government	610	645	735	840	881	945	1,006	809
Contract construction (local) 1/	188	117	150	150	120	110	150	141
Distributive industries	1,675	1,630	1,853	1,936	2,097	2,223	2,148	1,937
Subtotal	2,943	2,845	3,260	3,437	3,680	3,901	3,884	3,422
Total employment	5,479	5,313	6,273	6,755	7,288	6,649	6,723	6,354
Total population	13,823	13,530	14,267	14,220	15,750	15,577	15,155	14,617
Participation rate	39.6	39.3	44.0	47.5	46.3	42.7	44.4	43.5

1/ Primary employment estimates include construction of Ketchikan International Airport and other State facilities and State-financed community facilities. Induced employment (local) is the difference between reported total employment and estimated primary employment.

2/ Estimated. Published data are combined with other classifications to avoid disclosure.

Tongass National Forest Land Management Plan. Tables 3 and 4 illustrate the recent average annual employment by industry both for the Ketchikan Area and for southeastern Alaska as a whole.

Timber-related activities are clearly of primary importance in the Ketchikan Area and the Chatham Area, excluding Juneau, accounting for more than half the primary employment in each. Commercial fishing and fish processing is significant in the Ketchikan area, and it accounts for approximately two-thirds of the primary employment in the Stikine Area. The percentage of the 12-month average fisheries-related employment in the Stikine Area is probably accounted for by the labor-intensive shellfish production at Petersburg, the resident fleet's greater capabilities of participating in the Gulf halibut and groundfish fisheries, and the almost year-round activities of both harvesting and processing as compared with the more narrowly limited seasonal operations elsewhere.

E. Land Status

The land status situation on the sale area is constantly changing. Since the Tongass National Forest was created, scattered areas have been removed for private homesites, townsites, and so forth. Mining claims have been patented to remove more areas. Currently, lands are being withdrawn and transferred to the KAVILCO and to SEALASKA under the Alaska Native Claims Settlement Act of 1971. The State of Alaska, under the Statehood Act of 1958, is in the process of selecting land on the sale area. This is primarily at existing logging camps, but some selections are scattered and are for purposes other than community development. The Forest Service has approved the Thorne Bay and Port Protection selections that include units to be cut during the 1979-84 operating period, with the condition that these units will be cut under the contract. Details on these selections are shown on maps accompanying the "Tongass Land Management Plan Draft Environmental Statement."

F. Issues

Most of the issues relative to the long-term timber sale are thoroughly described in the TLMP DES and in the "Southeast Alaska Area Guide." One additional issue relative to this timber sale is the large timber volume and long-term duration of the contract between LPK and the Forest Service. The concern is that this contract is a constraint on the Forest

Service in applying measures to manage other resources. It is felt the large volume commitment becomes a constraint which forces the Forest Service to give less attention to other values. However, the other side to this issue is that if the job level is to be maintained, the same volume commitment would still be needed regardless of the kind of contract. The National Forest Management Act of 1976 validated the existing long-term timber sales in Alaska, but the issue still remains in the eyes of some.

Those issues which are pertinent to the 1979-84 operating period of LPK and covered in more detail in the TLMP DES are as follows:

Wildlife--Concerns involve what levels of wildlife populations should the national forest produce and how these desired levels can be achieved. Social importance of species vary according to location and to local or national demand. Desired levels, when established, can be achieved through either preservation of certain amounts of existing habitat or through management restrictions and control of how activities are performed.

Economic Issue--The Ketchikan Area greatly relies on the existence of the pulp mill, sawmills, and related logging for its economic well-being. The issue is whether or not the Tongass National Forest will continue to supply the timber volume needed to maintain this reliance at its present level.

Wilderness/Backcountry Issue--The areas on the LPK sale where wilderness is an issue are Salmon Bay Lake, Karta, and parts of Sarkar and Honker Divide. The concern is that all or some of these should be preserved as wildlands for future generations.

G. Management Concerns

The timber that is selected for harvest must "appraise out." This means that it must be economically viable. It must give a return, including capital investment in road construction, greater than the costs associated with harvesting and allow a reasonable opportunity for profit. The degree to which the marginal component will be included and the way in which other resources are protected are factors that are balanced against selling values to indicate a viable sale.

Another management concern is that the harvest should be planned so as to allow road connections between most of the communities on Prince of Wales Island. This is to enhance

recreation access on the island, provide safer and cheaper transportation between communities, and access for future management activities.

III. EVALUATION CRITERIA

The evaluation criteria used to weigh the alternatives are a combination of contractual, social, economic, and resource management requirements. The long-term timber sale agreement specifies several conditions relating to the selection of harvest units. The entire agreement is printed as Appendix A. The following criteria were developed from this agreement.

1. The volume of timber selected should equal 960 MM bm and be located on the primary sale area.
2. Timber selected for harvesting shall include rapidly deteriorating timber killed or damaged by fire, insects, or windthrow or selections made in order to protect other important national forest interests.
3. Timber selected for harvest will result in an economically viable operation as described in Section 1d. of the long-term contract.

Other noncontractual criteria are as follows:

4. Refrain from selecting units in roadless areas nationally identified as having potential for wilderness or roadless recreation. Within the primary sale area, these are Karta, Salmon Bay lake, and parts of Sarkar Lakes and Honker Divide.
5. Design harvest units and logging systems so that leave strips and deferred areas will be economically available in the future. Harvest the entire first entry area when roads are open in an area.
6. Complete the Forest multipurpose intrainland road system to connect all land-based logging and permanent communities on the Prince of Wales Island portion of the sale area (except Point Baker and Port Protection) to the Alaska Marine Highway system at Hollis. (Port Protection and Point Baker residents have expressed a desire to remain isolated from the road system.)

7. Maintain social and economic stability in the Ketchikan Area.
8. Conform to policies established by "Southeast Alaska Area Guide" published by USDA Forest Service, Alaska Region, in April, 1977.
9. Conform to "Operating Guides for Timber Sale Layout" when not in conflict with other criteria. These guides are printed in Appendix B.

IV. ALTERNATIVES CONSIDERED

Alternative maps are enclosed showing proposed timber harvesting and roading activities for each alternative. These are small-scale maps; for those wanting to review detailed maps, they are available for review at the Ketchikan Area Office of the Forest Service.

Alternative 1 is the LPK selection of harvest units presented to the Forest Service. The alternative would harvest 960 MM bm from the primary sale area in 380 units averaging 82 acres in size. Seventeen of these units are 160 acres or larger. The size range is from 9 to 546 acres. The unit boundaries when overlaid with timber type boundaries generally coincide with the highest volume timber types available in the area and emphasize harvest economy. The logging systems proposed include hi-lead, hi-lead with cold deck swing, A-frame with cold deck swing, helicopter, and skyline.

Road construction under this alternative would extend the existing network and tie Coffman Cove camp to Naukati. Ratz Harbor would be connected to Coffman through Baird Peak. Log transfer sites would have to be constructed or rebuilt as shown on the alternative map. Under this alternative most roadless and undeveloped areas over 5,000 acres in size, and remaining on the primary sale area would be entered by 1984.

Alternative 2 is a plan to take no action. Under this alternative the Forest Service would not allow the harvest of any other timber or the construction of any roads on the sale area in 1979-84. Lack of maintenance would require closure of all roads to the public.

Alternative 3 has 297 units averaging 70 acres in size for harvesting 794 MM bm from the primary sale area. Six of these units are 160 acres or larger. The size range is from 3 to 280 acres. This alternative places emphasis on the Forest's amenity values, such as

wildlife habitat and scenic beauty. Areas were selected for harvest only if no adverse, or only minor adverse, activities would affect amenity values.

Logging proposed under this alternative would include hi-lead, hi-lead cold deck, A-frame cold deck and several skyline variations. Favorable factors of timber operability are used to protect amenity values.

Road construction would extend the existing network from Naukati to Labouchere Bay through Coffman Cove, Whale Pass, El Capitan, and Turn Creek. Ratz Harbor would be tied to Coffman Cove through Luck Lake. Except for Karta, Salmon Bay Lake, Sarkar Lakes, and Honker Divide, most roadless and undeveloped areas would be entered this period.

Alternative 4 has 359 units averaging 77 acres in size for harvesting 960 MM bm from the primary sale area. Twelve of these units are 160 acres or larger. The size range is from 9 to 199 acres. These units would not necessarily provide the highest timber volume per acre, but instead they would develop areas so as to salvage blowdown timber and prevent loss of residual timber because of windthrow or lack of access. The logging systems proposed include hi-lead, hi-lead with cold deck, A-frame with cold deck, and several skyline variations.

Road construction under this alternative would extend the existing network of roads and connect Coffman Cove to Naukati. El Capitan, Whale Pass, and Labouchere Bay would be connected to Naukati through Sarkar Rapids. In order to facilitate the completion of the intra-island road system, it is necessary to leave the primary sale area between Naukati and Whale Pass, thus including the "Clam Chance" timber in the long-term sale. Additionally, a road connection from Coffman Cove to Ratz Harbor through Luck Lake would be built. With the exception of Karta, Salmon Bay Lake, Sarkar Lakes, Honker Divide, most of the roadless and undeveloped portion of the sale area would be entered during 1979-84.

Alternative 5 would exclude from harvest all areas over 5,000 acres on the sale area which are now roadless and undeveloped. These areas were identified in the RARE II planning process. Within the sale area, this alternative is the same as Alternative 4 minus development in roadless areas. It has 242 units averaging 77 acres

in size for harvesting 685 MM bm on the primary sale area. Nine of these units are 160 acres or larger. The size range is from 9 to 199 acres. The only arterial road connection would be from Coffman Cove to Naukati and Ratz Harbor through Luck Lake.

V. EFFECTS

This section describes the effects of implementation each alternative would have on the sale area.

A. Soils

Some soil disturbance, with resulting consequences, is unavoidable when natural systems are disturbed. Soil erosion as a mass land failure on slide-prone slopes may be accelerated where mineral soils are exposed, overland drainages are altered, and roads concentrate runoff. The first step in reducing or preventing erosion is to minimize the occurrence of factors leading to accelerated rates. Yarding of suspended or partially suspended logs disturbs less area than tractor logging or high leading with little or no lift. Also, suspended logs disturb less area than partially suspended logs when yarding downhill on steep slopes. Surface runoff materials will be less likely to reach the streams if the proximities of landings, roads, and sale units to streams are properly designed and regulated. Where mineral soils are bared and pose a threat of lower productivity or high stream sedimentation, grass seeding with fertilization will be done to minimize surface erosion.

Canopy removal increases solar radiation reaching the forest organic layer. This results in surface warming (Gregory 1956) and increased decomposition rates. By increasing decomposition, more available nutrients are released. The long-term effects from this are not yet known.

Youthful alluvial soils are subject to extensive erosion from periodic flooding and stream abraiding, depending on the degree of hazard. Activities on these soils must be done carefully or avoided to prevent stream damage.

Timber harvest units and roads could accelerate streambank cutting and surface erosion on V-notch drainages. These impacts can be largely controlled when properly managed. Yarding across or down V-notch drainages requires total suspension of logs. V-notches are high hazard areas, requiring detailed investigation by an interdisciplinary team.

Alternative 1--More soil erosion and loss of productivity would occur in this alternative than any of the others. The unfavorable impact in this alternative would result from not meeting many required guidelines during logging and roading. Timber productivity would be temporarily impaired over a greater number of units and acres through organic layer removal. This disturbance would result from using high lead yarding on areas where partial or full suspension should be used. Organic layer removal and mineral soil disturbance in these units would result in unacceptable accelerated soil erosion through mass failures and sheet erosion, especially where associated with V-notch drainages, slopes in excess of 68 percent, and soils with unstable characteristics.

Ordinarily, duff layer disturbance (raw mineral soil exposure) from high lead logging amounts to about 5 to 15 percent, but under this alternative up to 50 percent can be expected. Soil productivity for conifers will be reduced (on a 100-year cutting cycle) about 15 to 20 percent on soils not scoured to bedrock if they go through an alder stage. Without an alder stage, the setback is usually much higher, perhaps 50 percent. Where the soils are scoured to bedrock, productivity will be greatly impaired for the duration of the cutting cycle.

Several sections of roads are on soils and slopes where erosion would result in unacceptable sedimentation to streams and lakes. Other adverse effects on water quality because of sedimentation from road construction would be shorttermed and perhaps significant or measurable only during major rainstorms.

Alternative 2--Soils would be affected minimally under this alternative. The Forest Service would be required to take some immediate actions for closing unneeded roads and stabilizing exposed soil areas. Some soil disturbance and sedimentation, although minimal and short-termed, will result in pulling nonessential bridges and culverts, and road maintenance for permanent roads on Prince of Wales Island.

Alternatives 3 and 4--These two alternatives from the soil aspect would be equivalent in environmental impacts, even though Alternative 4 has more units and acres. The increase of units and acres in Alternative 4 over Alternative 3 units and acres that would not need special mitigating action from the soil aspect. Mitigating actions in the form of partial suspension or full suspension over nearly the entire length of the yarding distance would be required for 40 units to decrease adverse soil disturbance effects. Despite all

mitigating actions that could be applied in these two alternatives, some adverse impacts would result; however, these impacts would be less than under Alternative 1.

Timber productivity can be expected to be temporarily impaired wherever the organic layer is removed. This disturbance would amount to about 5 to 15 percent under these alternatives. The effect would be the same as stated in Alternative 1 for conifer regeneration and the cutting cycle.

Surface erosion would be accelerated in some areas, and some sediment production to streams could be expected when roading across streams or logging on stream edges. The effects would be short in duration, since guidelines apply and there are approximately 15 fewer miles of specified road than in Alternative 1.

Alternative 5--This alternative is nearly the same as Alternatives 3 and 4, except only 19 of the 40 units needing special mitigating action would be logged. The other 21 units are dropped in this alternative, since they are in roadless areas. The adverse and beneficial effects for the units in the roaded portion will be the same as stated in Alternatives 3 and 4. Short-term adverse impacts would result despite mitigating actions.

A more complete discussion of the effects on soils may be obtained on request in the "Soils Specialist's Report." See also the Soils Guidelines in Appendix B for soils management practices used in this plan.

B. Water

The following analyses are presented to highlight the key impacts. Timber harvests can affect both water quality and quantity. In southeast Alaska, the primary impact would be increased sedimentation. Many stream systems are susceptible to increased sediment loads caused by harvesting activities. The most sensitive streams are those which naturally produce the greatest amount of sediment, namely V-notch drainages, alluvial fans, and abraded stream systems. Roads pose the greatest threat for increased sedimentation from road pioneering work, culvert and bridge construction, cut and fill slopes, road surfaces, and borrow pits.

Although the increase in sediment is the primary impact from logging and road construction, increases are relatively low compared to other regions of the United States. One of the main reasons for the low recorded increase in sediment in Alaska is the type of roads most frequently constructed. Roads are for example, generally of overlay construction, built with rock blasted from quarries. When properly graded material is used, there is little source of sediment available, and the coarser material also provides an effective trap for what does exist. Stream crossings then become the key location and control point from the standpoint of sediment production.

In general, southeast Alaska streams are not considered to be highly sensitive to temperature changes resulting from timber harvest. Frequent cloudiness, low air temperatures, steep channel gradients, and frequent precipitation tend to keep stream temperatures below the range considered harmful to fish. However, stream temperatures may be increased if long strips of shade-producing vegetation are removed from along south, southwest, west, and northwest banks of temperature-sensitive streams. The streams most likely to be temperature-sensitive usually contain lakes and muskegs and organically-stained water, have low channel gradients, and southeast to southwest exposures.

The same natural characteristics that keep stream temperatures low also act to maintain high concentrations of dissolved oxygen (D.O.). Dissolved oxygen levels and biochemical oxygen demand may be affected if logging slash is allowed to accumulate in streams. But, generally southeast Alaska streams are not considered highly sensitive to D.O. depletion from timber harvesting activities.

Temporary changes in water quality can be expected from timber harvesting. But, all anticipated changes can be reduced to acceptable levels and returned to natural levels through proper planning and enforcement of watershed protection measures during and after logging activities.

Changes in streamflow would probably be negligible. Normally, restrictions on cutting design eliminate the potential for a measurably increased streamflow.

Sewage effluent from logging camps would have an impact on the marine environment in the form of nutrients, suspended solids, and biological activity. In all alternatives, onsite investigations and development of specific watershed protection measures would be required whenever sensitive landforms and channel systems are encountered.

At present, an active program for monitoring water quality is being conducted to help quantify the impact under various natural and manmade conditions. In all alternatives but Alternative 1, either the "best management practices" developed by the Alaska Department of Environmental Conservation or equivalent measures developed by the Forest Service would be implemented to control nonpoint pollution from timber harvest activities. The effectiveness of these measures would be evaluated through the monitoring program, and results would be used to determine compliance with existing State water quality standards.

For other specific analyses of impacts that would also apply to water, see "Effects on Fish" and "Effects on Soil."

Alternative 1--This alternative would have the highest potential impact on water quality because of the excessive ground disturbance as a result of highlead logging.

Several sections of roads are on critical soils and slopes where soil erosion will result in unacceptable sedimentation to streams and lakes. Other adverse effects on water quality because of sedimentation from road construction will be short-termed and may be significant or measurable only during major rainstorms.

Table 5 lists the miles of water courses adjacent to timber harvest units. The table shows Alternative 1 having significantly more miles of water course affected by timber harvest than the other alternatives.

TABLE 5--Extent of stream miles affected
on the sale area by timber harvesting alternatives 1/

Stream location or description adjacent: to harvest units	Extent of streams affected by Alternative--				
	1	2	3	4	5
			<u>Miles</u>		
Watercourses	55.55	0	19.7	26.10	15.55
Waters inaccessible to anadromous fish:	13.30	0	7.15	9.0	4.95
Intertidal areas	4.50	0	.8	1.20	0
Lakeshores	3.55	0	.3	.40	.15
Streams accessible to anadromous fish:	34.2	0	11.45	15.50	10.45
Temperature-sensi- tive streams accessible to anadromous fish	17.5	0	3.3	3.80	1.35

1/ Distances scaled from 2-inch-per-mile forest development maps.

Alternative 2--The only impacts foreseeable under this alternative would arise from sedimentation resulting from removal of bridges and culverts following closure of no-longer-needed roads in the sale area.

Alternatives 3, 4, and 5--These would affect water quality in similar ways. These alternatives call for more timber harvesting on steep slopes than would Alternative 1, but they provide for appropriate logging systems to mitigate impacts that would otherwise occur if highlead logging took place. Considerably fewer miles of streams would be affected by timber harvesting adjacent to streams under these alternatives than would Alternative 1. But, temporary stream sedimentation will occur where roads cross streams or where harvest units are adjacent to streams.

All alternatives, except Alternative 1, are believed by the IDT to be within the guidelines established for the long-term sale (Appendix B) and the "Southeast Alaska Area Guide." Even so, some adverse but acceptable impacts will result, despite whatever mitigating actions are applied.

A more complete discussion of the effects on water, may be obtained on request in the "Hydrologist Specialist's Report."

C. Fish

Reviews of literature on the effects of logging indicate that many environmental variables simultaneously operate in the forest/stream ecosystem. Complex variable interactions occur when developments are being initiated, are underway, or have ceased. Many detailed research efforts have resulted in inconclusive results. To date, research has not shown that timber harvesting as conducted in southeast Alaska significantly affects fisheries resources on a long-term basis.

Few measurable values were available to the IDT preparing this plan. Prescriptions were developed (See Appendix B and the "Southeast Alaska Area Guide" to protect fish habitat. Current monitoring programs are testing these prescriptions for adequacy. With this background and for the purposes of this operating plan, a basic assumption will be made. That is, if all forest development activities conform to accepted policies and guidelines, completed as through site-specific prescriptions, then impacts on fish are either nonexistent or minimized to an acceptable level.

Alternative 2 will result in no environmental impact to fisheries resources resulting from the long-term sale. Future impacts would depend upon what activities that were eventually undertaken.

Implementation of the timber harvesting alternatives (Alternatives 1, 3, 4, and 5) will result in these general impacts:

- *Temporary increased stream sedimentation.
- *Temporary changes in stream temperature regime.
- *Stream and estuarine habitat loss.
- *Temporary change in stream and estuarine habitat productivity.
- *Increased access by people to lakes and streams.
- *Increased opportunities to conduct direct fish habitat improvement projects.

Increases in stream sedimentation--These increases are normally temporary, lasting from 1 to 5 years. Most sediment is introduced during rainstorms from areas where the ground is disturbed during logging and road construction, including drainage structures.

Sedimentation inhibits intragravel flow and interrupts the necessary gas exchange between deposited fish eggs and alevins and the aquatic environment. It also contributes to physical, physiological, and thermal stress on juvenile and adult salmon. Additional impacts of sedimentation may be alterations in the biomass and species composition of agnatic insects. Adherence to the State water quality guidelines would either eliminate these impacts or keep them within acceptable limits.

Temporary changes in stream temperature regime--Removal of the forest canopy by timber harvest directly increases solar radiation into the stream environment. Increased solar radiation results in an increase in summer stream temperatures. This is especially true for temperature-sensitive streams. Metabolic rates for coldblooded animals which inhabit this environment, primarily rearing fish and aquatic insects, vary directly with the ambient stream temperature. As the average stream temperature increases beyond the threshold point, a relatively greater portion of the energy ingested by a fish is required for bodily maintenance functions rather than for growth. If demands for maintenance energy continue to increase, and approach or exceed a critical threshold temperature, eventually metabolic stress and death will result. Dissolved oxygen levels also decrease. Thus, the overall effect of increasing the average ambient stream temperature above the threshold point is to reduce the potential productivity of the system to produce fish.

Temperature sensitivity is not confined strictly to summer warming. The forest canopy acts as a temperature moderator during winter extremes. Removal of the forest canopy will contribute to expanding the winter extremes into the stream environment.

Again, application of the guidelines would keep temperature changes within acceptable limits and return them to natural levels within 10-15 years after logging.

Stream and estuarine habitat loss--Stream crossing structures can cause habitat loss or alteration. This loss occurs from the installation of structures with artificial bottoms directly over suitable fish habitats. The prime example of this is where corrugated metal culverts are improperly installed in the stream. Present-day culvert design guides require that where natural conditions permit, namely stream gradient and substrate, culverts must be designed to pass both juvenile and adult fish. For this, open bottomed culverts are preferred.

A second design concept that incorporates oversizing and burying of the culvert has also been tested and found to be very adequate for passing fish. This concept further assumes that the natural streambed will become reestablished inside the culvert, following installation, through deposition from upstream areas. A necessary part of this design is a plunge pool built at the outlet as an energy dissipator. This pool is intended to insure the maintenance of the deposited streambed inside the pipe and also prevents formation of an outfall drop. Periodic storms may wash this material from within the culvert. Redeposition will occur from subsequent lower flows.

In the estuary, loss of habitat results from rock fills for construction of log transfer points.

Temporary change in stream and estuarine habitat productivity--Changes in water temperature and sedimentation can cause a change in stream productivity. Log transfer to saltwater causes bark accumulation, resultant leaching, and losses in dissolved oxygen. Log storage in intertidal areas causes compaction of benthic habitat, and some organisms are crushed. Site surveys have been conducted by the U.S. Fish and Wildlife Service to insure that proposed log transfer facilities are located in conformance with the area guide policies.

Increased access by people to lakes and streams--Expansion of road systems would lead to increased sport fishing on many stream systems. This impact would be long term if the roads were kept open in the future as many are planned to be.

Increased opportunities to conduct direct fisheries habitat improvement--Several streams on the sale area offer opportunities for stream enhancement work. This could be done through appropriated funds or with reforestation (KV) funds from this timber sale. Habitat improvement opportunities consist primarily of alteration of natural barriers to fish passage. Other opportunities are removal of natural debris accumulations that adversely affect fish habitat.

It is assumed the degree of impact on fisheries is directly related to the amount of harvest adjacent to fish streams. The proximity to fish streams is not the sole criterion however, as stable or relatively problem-free ground immediately adjacent to a fish stream can be less of a problem to fish habitat protection than unstable ground well away from the stream. Table 5 shows the varying extent of streamside cuts by each alternative.

Comparisons of these data show that the amount of proposed timber to be harvested in low-elevation and valley bottom lands is substantially greater for Alternative 1. Also, considering the nature of the topography and stream morphology in southeast Alaska, a large percentage of the accessible habitat for anadromous fish occurs in these same low-elevation valley bottom lands. Therefore, it may be concluded that Alternative 1 will cause a substantially greater impact on fisheries resources than will any of the other alternatives.

Estuarine effects from log transferring facilities will be similar for each alternative, differing only in the number of transfer facilities needed on the primary sale area for each alternative. These are shown in table 6.

TABLE 6--New and reconstructed log transfer facilities by alternative.

Alternative	:	New facilities	:	Reconstructed facilities
1	:	8	:	3
2	:	0	:	0
3	:	7	:	3
4	:	9	:	4
5	:	4	:	3

Unavoidable short-term impacts from timber harvesting in conjunction with the best possible application of habitat protective prescriptions are sedimentation and disruption of fish habitats from temporary road drainage structures. Additional short-term impacts will result from occasional slash and logs from hazardous trees falling into or across fish streams.

Unavoidable long-term impacts will be habitat loss and/or alteration from permanent road drainage structures and fill from log transfer facilities. The altered temperature regime in temperature-sensitive streams would be a long-term impact for Alternative 1. Additional possible long-term impacts will be sedimentation, streambank disruption, migration blockages, human use, and disruption of streamchannel stability resulting from blowdown of residual streamside timber.

Environmental impacts that are cumulative in nature are habitat losses from expansion of the forest road system. Continuous timber harvesting in watersheds that contain temperature-sensitive streams would create a cumulative impact on the temperature regime if Alternative 1 were chosen.

For further details on impacts on fisheries, see the "Fisheries Specialists Report."

D. Wildlife

Developmental activities in the forest environment have varying effects on different species of wildlife. Many of the species present in southeast Alaska are most adapted to using the old-growth spruce-hemlock stands, and converting these to second-growth stands, as Alternatives 1, 3, 4, and 5 propose, would change their productivity for these species.

Table 7 shows the estimates of the amount of this old-growth habitat each of several key wildlife species need for maintaining wildlife populations.

TABLE 7--Percentage of natural cover types believed necessary to maintain wildlife populations

Specie or group	Extent of cover needed in the wildlife habitat management unit <u>1/</u>				
	Sub-	General	General	General	Winter
	alpine	forest	Estuarine:	beach	range
	Percent				
Sitka Black-tailed Deer	50	50	50	50	90
Black Bear	50	25	100	25	25
Wolf	50	50	50	50	90
Waterfowl	-	-	100	-	-
Pine Marten	50	50	50	50	50
Land Otter	-	-	50	50	50
Mink	-	-	50	50	50
Beaver	-	-	50	50	50
Upland Game Birds	50	50	50	50	50
Shore Birds	-	-	100	-	-
Nongame Land Birds	50	50	50	50	50
Small Mammals <u>2/</u>	50	50	50	50	50
Marine Mammals <u>2/</u>	-	-	-	-	-
Amphibians and Reptiles	25	25	25	25	25
Water Birds	-	-	100	-	-
Raptors <u>2/</u>	25-50	25-50	25-50	25-50	25-50
Old-Growth Obligate Birds:	50	50	50	50	50
Northern Bald Eagle	-	-	100	50	100

1/ Dashes mean that the cover type is not directly related to the primary habitat need by that kind of wildlife.

2/ Levels of natural habitat necessary for population maintenance were not set as a part of TLMP. These estimates considered the habitat needs of species; others were set as a part of TLMP.

With these levels in mind, the following habitat management objectives were set for each Wildlife Management Unit (WHMU):

Alpine--Habitat alteration by management activities is minimal in this WHMU. Adjacent activity and disturbance of the wildlife utilizing the alpine is the main concern because of the lack of escape cover. Land management activities should be planned in and adjacent to this WHMU so as to control human disturbance and access.

Subalpine--Properly spaced units could allow harvest of up to 50 percent of the subalpine without significantly affecting population levels of species utilizing this WHMU. Timber harvesting patterns should emphasize dispersed patchcutting with a maximum number of entries during a rotation period (100 years).

General Forest Area--Conversion of more than 50 percent of the mature timber types of this area to management of even-age stands can be expected to reduce populations of certain indigenous species. The spatial and temporal arrangement of cutting units is critical to proper management of this habitat. Maximizing the number of cover types will decrease impacts on individual wildlife species and increase species diversity to an area.

Key Winter Range--To maintain the natural carrying capacity of the Forest for Sitka black-tailed deer, nearly all or at least 90 percent of this WHMU should be retained in the natural state of climax spruce-hemlock forest or in a state which approximates the climax forest attributes.

General Beach Fringe--This WHMU is highly utilized by wildlife species. At least 50 percent retention of the natural cover types is necessary to maintain the potential for natural levels of wildlife populations.

Estuarine--It is necessary to retain 100 percent of the cover types adjacent to the estuarine areas to maintain natural levels of wildlife species. The adjacent cover types retained should be 500 to 1,000 feet wide.

Each alternative is then evaluated to see how well it meets the WHMU objectives. The sale area was divided into seven subareas having similar past cutting practices. Analysis of WHMUs were made for each subarea by alternative.

The average size of clearcuts would be 82 acres for Alternative 1, 70 acres for Alternative 3, and 77 acres for Alternatives 4 and 5. A smaller clearcut size creates more edge and therefore

more habitat diversity. Figures 2 and 3 show previous and proposed cuttings in key winter deer range and the general forest zone. Table 8 shows the impact of each alternative on certain species and groups of species.

Alternative 1--This alternative adversely affects all the subarea's key deer winter range by changing more than 10 percent of the climax forest cover type to even-age stands managed primarily for timber production (fig. 2). Analysis of this alternative indicates that three WHMUs are negatively affected. They include the general forest zone, winter range, and estuarine. Alpine, subalpine, and general beach receive little or no impacts as a result of the proposed action.

The effects indicated vary according to sub-area considered. The effects are mostly related to the amount of key winter range and estuarine WHMU timber harvested and to the spatial and temporal arrangements of cutting units in the general forest habitat management unit.

This alternative proposed cutting in the estuarine habitat management units of Staney, Naukati, Shaheen, Whale Pass, Exchange Cove, and Lake Bay. The resulting cutting would reduce the suitability of these areas to support natural populations of indigenous species of wildlife.

Seven species or species groups will suffer adverse effects. Three will be favorably affected (table 8).

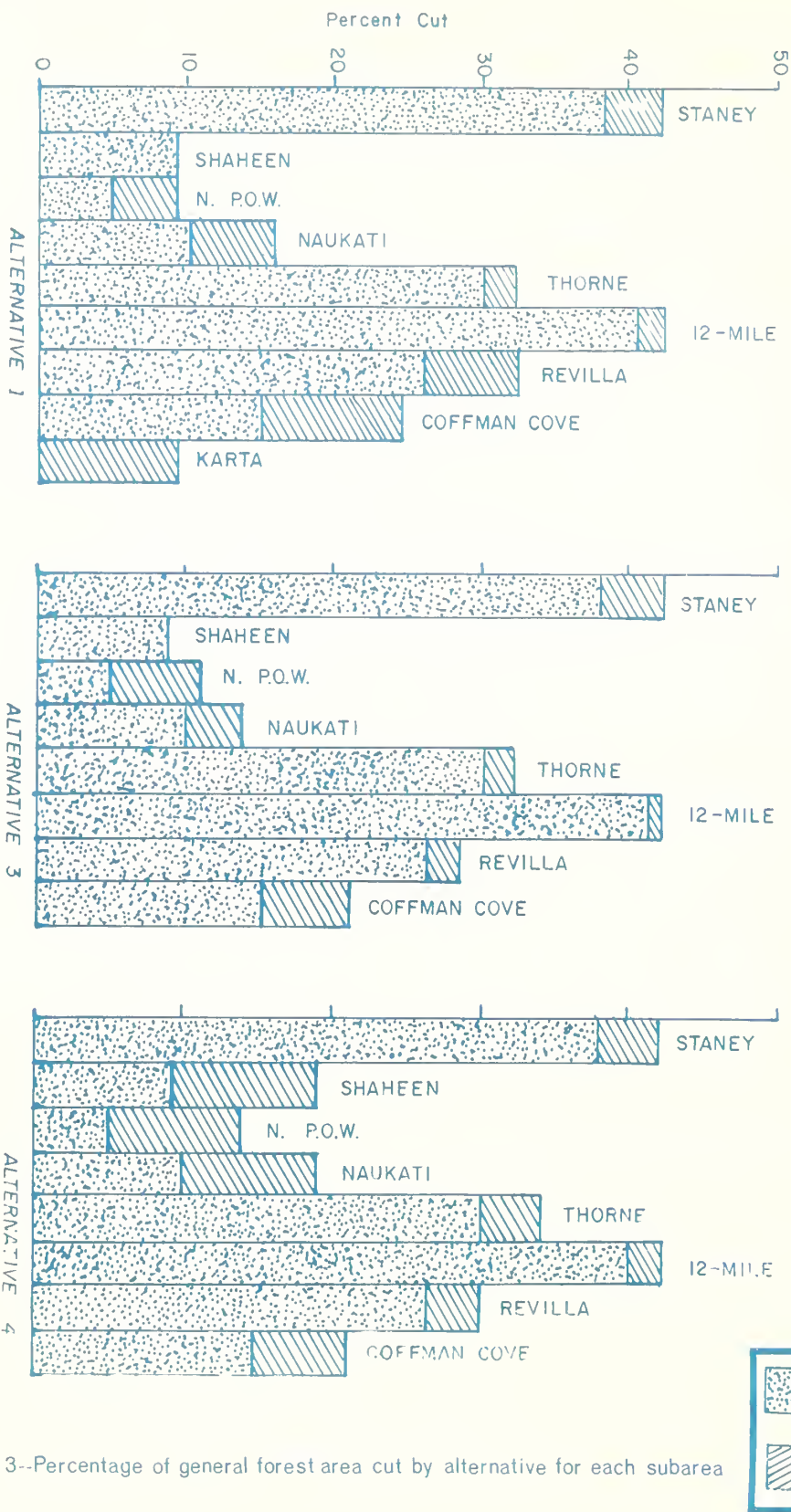


FIGURE 3--Percentage of general forest area cut by alternative for each subarea

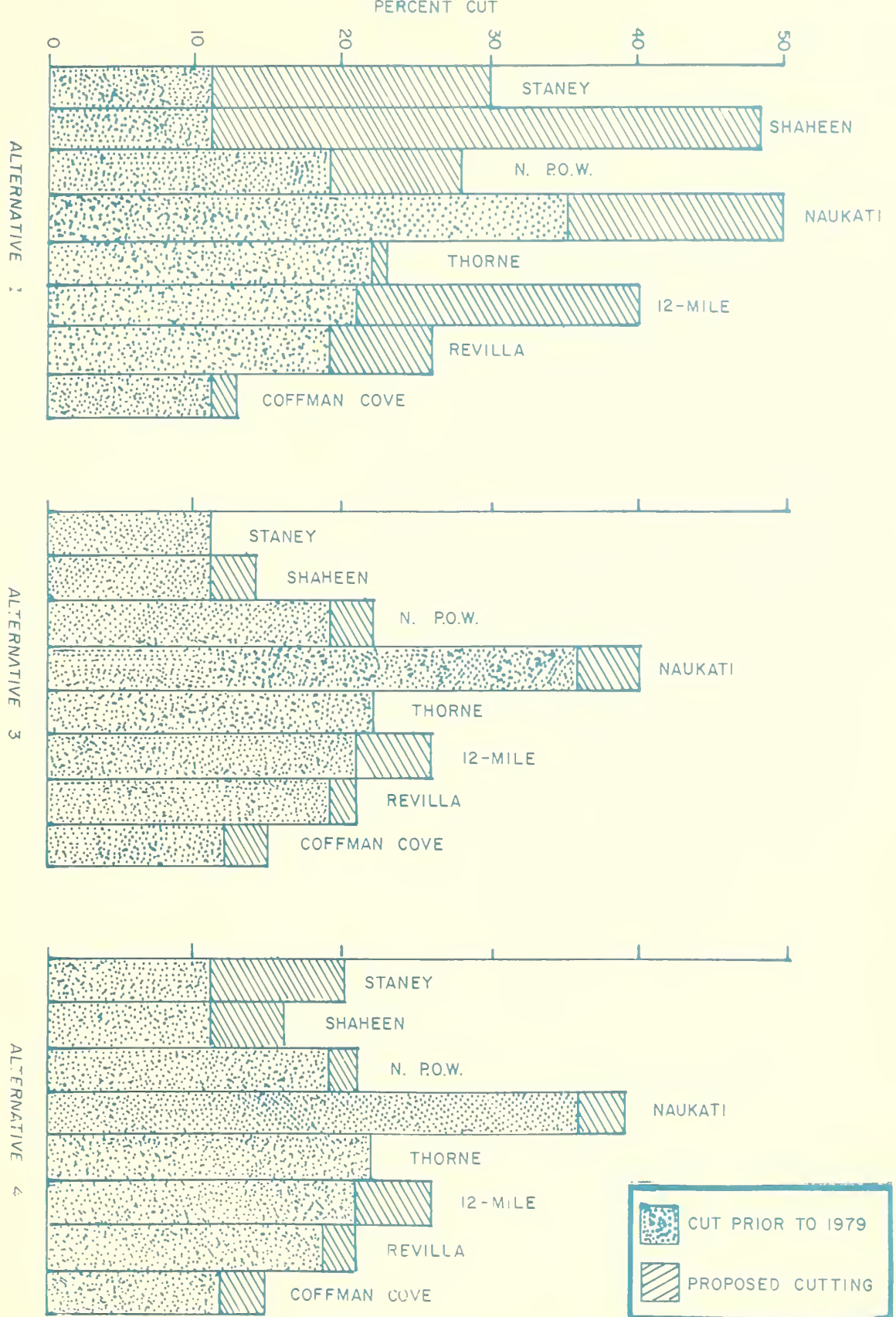


FIGURE 2 -- Percentage of key winter deer range cut by alternative for each subarea

TABLE 8--Relative effects on individual species or species groups by alternative

Species or group	Effects of Alternative-- 1/				
	1	2	3	4	5
Sitka Black-tailed Deer	-	0	-	-	-
Black Bear	0	0	0	0	0
Wolf	-	0	-	-	-
Waterfowl	-	0	0	0	0
Pine Marten	-	0	-	-	-
Land Otter	0	0	0	0	0
Mink	0	0	0	0	0
Beaver	0	0	0	0	0
Upland Game Birds	0	0	0	0	0
Shore Birds	0	0	0	0	0
Nongame Land Birds	+	0	+	+	+
Small Mammals	+	-	+	+	+
Marine Mammals	-	0	0	0	0
Amphibians and Reptiles	-	0	-	-	-
Water Birds	0	0	0	0	0
Raptors	+	0	+	+	+
Old-Growth Obligate Birds	-	0	-	-	-
Northern Bald Eagle	-	0	-	-	-

1/ - = adverse effect, 0 = no effect, and + = favorable effects.

Alternative 2--This alternative will have no adverse effects on wildlife populations, nor does it allow for enhancement through patchcutting to increase edge and increase habitat diversity. Species and their habitats would remain in their natural balance without the habitat alteration of timber harvesting.

Alternative 3--During the IDT process, wildlife resource considerations were given emphasis by stressing smaller clearcuts, maximizing spacing between proposed and existing clearcuts, harvesting in beach fringe areas only as habitat improvement, protection of specialized habitat types including lake shores and riparian zones, and maximizing age-class variety over large areas, especially those areas with high recreation potential. Areas of high potential recreational use of wildlife included the Sarkar Lake, Behm Canal, Hollis, Harris River, Gold and Galligan Lagoon, and along the main Prince of Wales Island interconnecting road system.

This alternative would basically meet all the habitat management objectives, except for key winter deer range. Cutting in this WHMU, although minor in extent, would reduce the carrying capacity for deer in all areas except Staney Creek (fig. 2). Alpine, general beach fringe, and subalpine habitat management units would receive little or no impacts as a result of this proposed alternative.

Alternative 4--The effects of this alternative on the wildlife resource are similar to those of Alternative 3 (figures 2 and 3). During the IDT process, some minor wildlife tradeoffs were made to stay within the primary sale area. Additional cutting units in key winter deer range were made in the Staney and Shaheen areas. Units were added in the general forest zone, some adjacent to existing clearcuts. Any resulting effects would be minor and localized, not significantly affecting wildlife populations for any subareas.

Alternative 5--The units dropped from Alternative 4 to create this alternative are all located in upland roadless areas away from critical wildlife habitat. The impact of this alternative would be slightly less than Alternative 4 for wildlife dependent on old-growth stands. Further details on wildlife effects may be obtained on request in the "Wildlife Specialists Report."

E. Vegetation

Clearcutting under Alternatives 1, 3, 4, or 5 would lead to a series of vegetative changes. A detailed description of these can be found in the TLMP DES.

After logging, the vegetation would basically consist of shrubs, forbs, and a few hemlock seedlings and saplings. During the first 5 years, the additional light and heat reaching the forest floor would cause a proliferation of shrubs and forbs along with seedlings of spruce and hemlock. The shrubs dominate the cover type for 10 to 15 years, at which time spruce and hemlock begin to appear above the brush. After 20 to 30 years, the tree canopy normally closes and the brush is shaded out. From then through the planned rotation age (generally 100 years), the stand would thin naturally to 100 to 300 trees per acre. The average 100-year-old tree is 110 feet high in southeast Alaska. Table 9 summarizes the number of acres that would be harvested by alternative.

TABLE 9--Size of areas to be harvested by
alternative on the sale area

Alternative	:	Area
	:	<u>Acres</u>
	:	
1	:	31,330
2	:	0
3	:	20,837
4	:	27,524
5	:	16,993

F. Timber

Clearcutting is the principle silvicultural system applicable in the spruce-hemlock forests of southeast Alaska (Ruth and Harris) for several reasons. Among these are species composition, dwarf mistletoe control, windfirmness, growth rate, and susceptibility to injury during logging. Following are some general impacts of harvesting timber by clearcutting that would occur under Alternatives 1, 3, 4, or 5:

Blowdown would occur along edges of some clearcuts; cutting in small clearcuts under this plan could increase total blowdown. However, Ruth states that windfall is closely related to other factors, such as topography, soil, species, and stocking, and that these other variables apparently exert more effect than size of clearcut. Care would be taken during layout to locate cutting lines to minimize blowdown.

Loss of timber volume and productivity under this plan would occur from the following sources: unsalvageable windthrow, areas retained to protect other values, and not converting the entire area to young-growth stands now. These losses would be irretrievable.

Increased tree vigor in new stands would reduce the loss of wood fiber because of insect pests and diseases. Thus, annual production or volume of wood harvested would increase following the harvesting of old stands. The net annual growth of the old-growth stands in southeast Alaska is zero, but in an average stand on an average site, the mean annual increment is 524 board feet per acre or 52.4 M bm per acre at 100 years of age (TLMP).

Roads constructed for timber harvesting would provide access for timber management activities. Timber harvested by patch-cutting would provide greater ecological variety in various stages of plant succession as compared with cutting entire drainages as done in the past.

By alternative, the effects on timber would vary as follows:

Alternative 1 would harvest 960 MM bm of timber from the sale area. Emphasis would be placed on obtaining maximum wood fiber at low development cost. Generally this would result in large harvest units located in valley bottoms and lower side-slopes. Harvesting of blowdown timber would be restricted to timber which is readily available at roadside.

Heavy reliance on valley bottom road systems and highlead logging often isolates timber stands upslope from harvest units. Future logging of such upslope stands is made difficult by lack of tail holds for cable systems or the need to construct roads through young stands of trees wasting the new growth.

This alternative seeks to harvest the lands with the highest potential for timber growth remaining on the sale area. These stands should be the easiest to regrow and yield the highest return for the investment.

Alternative 2 would stop the harvesting of timber on the sale area. The oldest stands would continue to breakup, blowover, and regenerate naturally as they have for hundreds of years. Very little if any net growth is occurring in these stands.

The younger stands originating from the cutting of the past 25 years would continue to grow at a fairly rapid rate, depending on their site index. On the average, these stands should reach culmination of mean annual increment at about age 80 (Taylor). They will of course continue to grow and add wood for another 100 years before they reach a static old-growth condition.

This alternative would forego the opportunity to replace the old-growth timber with fast-growing second-growth stands. The volume lost would be the difference in growth rates per acre per year; the loss would be irretrievable.

Alternative 3 would harvest 794 MM bm on the sale area.

The emphasis of this alternative would be to harvest timber where it would have a minimal impact on the wildlife and visual resources. This generally meant locating small or no harvest units along beaches adjacent to the ferry lane or in key winter deer range. Cutting adjacent to previously harvested areas would be restricted to only blowdown trees and intermingled green trees. These areas would be left when the cost of harvesting becomes greater than the value of the wood recovered. These areas would also be left if salvage would have required additional harvest of standing green timber to reach a windfirm boundary.

In many cases, the Alternative 3 layout would not include all timber available for harvesting in the first entry. In some cases, camps would be moved by the end of the 5-year period, leaving a few available first-entry units unlogged. It would be costly and inefficient to return to these a few years later.

Alternative 4 would harvest 960 MM bm of timber from the sale area. Most of the units included in Alternative 3 are included in Alternative 4. These units were made larger to increase volume and salvage blowdown or to reach windfirm boundaries. Additional units were placed along the Prince of Wales Island main road system but not along the ferry route. A few units were added in the beach zone.

Alternative 5 would harvest 685 MM bm of timber from the primary sale area. The main emphasis of this alternative would prevent development of any inventoried roadless area greater than 5,000 contiguous acres. The units to be harvested are identical with Alternative 4 units that occur in currently roaded and developed areas.

G. Socioeconomic

Implementation of any one of the alternatives would affect jobs, recreation, and public service and social interaction between communities and logging camps.

Jobs--Alternatives 1 and 4 would have almost no impact on current jobs. Timber jobs can be expected to remain the same under either alternative. Higher construction standards under Alternative 4 compared with increased road mileage under Alternative 1 would balance the number of construction jobs.

Alternatives 3 and 5 would reduce the number of timber and support jobs during the 5-year period.

Alternative 2 would nearly eliminate the timber industry from the Ketchikan Area, except for logging of private lands and perhaps a cant mill. Considering that induced employment is proportional to primary employment, the Ketchikan Area would lose about 50 percent of its employment level, or about 3,400 jobs. This alternative could result in a multimillion dollar damage settlement the public would have to pay to LPK for breach of contract.

Recreation--Implementation of any alternative would change the recreation type and pattern on Prince of Wales Island (see recreation impacts). The effects on the road-oriented recreation would vary by alternative. To the extent that an alternative would enhance completion of the arterial system, it would benefit road-oriented recreation and therefore the economic benefits from this recreation. Fishing and hunting are primary pursuits of local camp or community residents, and driving for pleasure combined with fishing and camping are the main attractions of ferryship travelers.

Alternative 2 could result in about an 80 percent decrease in road-oriented recreation because of the demise of the logging communities and the lack of road maintenance. This would result in most roads being closed.

Alternatives 3 and 4 would have a similar effect on road-oriented recreation during the life of this plan. Both alternatives would tie Coffman Cove, Whale Pass, and Labouchere Bay to the public road system and the ferry. Alternatives 1 and 5 would provide for public travel between Coffman Cove and the ferry.

Public service and social interaction--Since Thorne Bay and Naukati have been connected to the public road system, Craig has become a shopping center. The people are forming intercommunity social ties, and the communities have begun cooperating to achieve mutually beneficial projects, such as State highways, power facilities, and community fairs. Similar development is expected as the logging communities of Whale Pass, Coffman Cove, and Labouchere Bay are connected in the future.

H. Minerals

The proposed timber harvesting plan would have no adverse impact on minerals and mining. Prospecting would continue, and roads could enhance opportunities for this activity.

I. Recreation

Impact on Existing Recreation Use--Most of the existing recreation use is associated with saltwater shorelines, accessible lakes, rivers, and streams. Hunting often occurs within a mile or so of the beach or other points of access and along some of the Prince of Wales Island road system in recently clearcut areas. Roads emanating from communities generally receive high day use with some overnight camping in certain locations.

In Alternative 1, large units proposed on the shores of Sweetwater Lake, Sarkar Lake, Staney Creek, and Salmon Bay would bring logging activities into close proximity to people recreating in these areas and would affect existing use patterns by introducing roads and discordant effects. The units proposed on Sarker Lake are directly located on an identified potential campground site and on an old trail connecting Sarkar Cove to Sarkar Lake.

The very large units across Traitors Cove and on the opposite side of Marguerita Bay from the cabin, and the hauling of logs past this cabin from units further back in this drainage, would continue to introduce discordant effects in an area already heavily affected by logging activities. Effects on the deer population (see Wildlife section) would decrease the opportunity for hunting.

Units proposed in Barnes Lake, Red Bay, Salmon Bay Lake, Salmon Lake, and along the ferry route will introduce roading and discordant effects. But, they would not be in so close a proximity to the recreation use areas.

In Alternative 1, the only sections of the mainline road system that would be tied together are Coffman Cove to Naukati and Coffman Cove to Ratz Harbor. This would eventually result in increased public access to recreation use areas in the Sweetwater-Hatchery-Logjam Creek-Coffman Cove area. Recreation areas, such as Red Bay and Whale Pass in the northern portion of Prince of Wales, would not be accessible by road in this 5-year operating period.

In Alternative 2, some road closures and population decreases would result in changed recreation use patterns. No further links in the Prince of Wales Island road system would be made under this alternative. No more recreation use areas would be reached by roads than at present.

In Alternative 3, units and roads are proposed in the Red Bay and Barnes Lake-Sweetwater Lake area, but they are not to the scale proposed in Alternative 1. The degree of discordant effects would be much less than in Alternative 1. The same impacts will be present in the vicinity of the Marguerita Bay cabin as in Alternative 1, except that unit sizes will be much smaller. Units planned along much of the main road system are generally small and in many cases designed to enhance visual variety and provide views.

Under Alternative 3, all logging camps on Prince of Wales Island are linked to the main road system. Hence, existing recreation use areas on the northern half of the island as well as in the Coffman Cove-Sweetwater area would be made accessible by road. Coffman Cove will also be tied to Ratz Harbor, but the connection would be by a more inland route behind Baird Peak.

In Alternative 4, the impacts on recreation use would be similar to those in Alternative 3. But, the heavier cutting along the main road system would produce a high level of discordant effects along several sections of the road.

Links in the main road system would be constructed to tie Naukati to Coffman and Naukati to Whale Pass and El Cap through Sarkar Lake. Hence, recreation areas in these locations will be made accessible by road. Red Bay and Labouchere Bay, however, would not be linked to the main road system, and Coffman Cove would be tied to Ratz Harbor by the same route as in Alternative 3.

In Alternative 5, the recreation impacts are in the Barnes-Sweetwater area and would be the same as in Alternative 4. The only link added to the main road system would be between Coffman Cove and Naukati.

Impact on Recreation Opportunity--When areas scheduled for development are entered, recreation opportunities will be altered. Some activities, such as wilderness or wildland experiences, may be eliminated in the areas developed, depending on the type and extent of that development. Other activities may be enhanced if they are aided by roads and other modifications.

Each drainage area included in this DES is a somewhat isolated entity, and activities in one drainage area would not normally affect potential recreation opportunities in adjacent drainage areas. Most impacts on recreation are long term, but they could be reversed in the future if the roads were closed and timber harvest stopped.

Timber harvest in a roadless drainage can have a profound effect on the recreation opportunities both during the operation itself and for many years afterward. Activities associated with campfire, roadbuilding, logging, hauling, and rafting of logs all tend to displace recreation users requiring solitude and natural environment.

For areas considered in this DES, increased human activity and the potential conflict with established wildland use patterns would spread beyond the camps and logging locations to nearby bays and islands under some of the alternatives. After completion of harvesting, solitude would return to the area as the people leave and facilities are removed. Those recreation activities aided by the remaining roads and vegetation changes would then be available in a relatively isolated environment. More of the semiprimitive recreation qualities would return as revegetation of cutting units and spur roads occur and the physical logging effects are masked. With crown closure of the cutover areas occurring some 15 to 30 years after harvest, the area would once again begin to provide a pleasing appearance, except for the main gravel roads. However, if the drainage area is managed on a multiple entry concept, the second entry could be scheduled at about this time, and the sequence would repeat itself.

Impacts on opportunities for dispersed primitive recreation would be greater in roadless drainages scheduled for initial entry than in those previously entered (see table 10). The introduction of roading noise and discordant visual effects would alter the opportunity for recreation in an isolated environment. In either case, opportunity for dispersed primitive recreation would be lower, with the magnitude depending on the type and standard of roads built and the number and size of harvest units and closeness to attractions.

TABLE 10--Locations which have high values for dispersed primitive recreation and are proposed for entry by alternative 1/

	Entry proposed by Alternative--				
High-value area for dispersed primitive recreation	1	2	3	4	5
Red Bay	Yes	No	Yes	Yes	Yes
Salmon Bay Lake	Yes	No	No	No	No
Whale Pass	No	No	Yes	No	No
Barnes-Sweetwater	Yes	No	Yes	Yes	Yes
Karta	Yes	No	No	No	No

Opportunity for dispersed semiprimitive recreation would also change in roadless areas scheduled for entry (see table 11). Entry would result in a slight lowering of opportunity, because access and discordant effects only slightly detract from semiprimitive recreation. This would depend on the number, type, and standard of roads built and the number and size of harvest units, nearness to attractions, and so forth.

TABLE 11--Locations which have high values for dispersed semiprimitive recreation and are proposed for entry by alternative 1/

	Entry proposed by Alternative--				
High-value area for dispersed semi-primitive recreation:	1	2	3	4	5
Salmon Bay Lake	Yes	No	No	No	No
Red Bay	Yes	No	Yes	Yes	Yes
Whale Pass	No	No	Yes	No	No
Barnes-Sweetwater	Yes	No	Yes	Yes	Yes
Shaken Bay	Yes	No	Yes	Yes	No
Port Protection	Yes	No	No	Yes	Yes
Ratz Harbor	Yes	No	Yes	Yes	Yes
Tuxekan Pass	Yes	No	Yes	Yes	Yes
Salt Chuck	Yes	No	Yes	Yes	Yes
Karta	Yes	No	No	No	No

1/ Recreation types are defined in section II-C.

The opportunity for concentrated recreation would improve in entered areas. Timber harvesting would introduce discordant elements and visual effects which may detract from this type of recreation. The introduction of roads and road-orientated facilities, such as campgrounds, would increase the supply of concentrated recreation opportunities.

The "Recreation and Visual Resource Specialists Report" can be obtained on request for more details on recreation impacts.

J. Wilderness

Areas which are entered for timber harvesting or that have less than 5,000 acres of roadless area remaining would not normally be considered for wilderness classification by the Forest Service until roads and harvested areas are no longer evident. (See alternative maps for roadless areas being entered.) Roadless areas which would be affected, by alternative, are:

Alternative 1--The total roadless area over 5,000 acres in size would be reduced by about 120,000 acres. Recognized potential wilderness areas at Karta, Salmon Bay, Honker Divide, and Sarkar would be entered.

Alternative 2--No roadless areas would be affected.

Alternative 3--This alternative would reduce roadless areas over 5,000 acres in size by about 105,000 acres on the sale area. Wilderness options would be preserved at Karta, Salmon Bay Lake, Sarkar and Honker Divide.

Alternative 4--This alternative would reduce roadless areas over 5,000 acres in size by about 105,000 acres on the sale area. The Wilderness option would be preserved in Karta, Salmon Bay Lake, Sarkar, and Honker divide.

Alternative 5--No roadless areas would be affected.

K. Visual

An evaluation of the impacts of these five alternatives on the visual resource is based on an analysis of how the proposed activities meet the inventoried visual quality objectives (VQOs). These are derived from an inventory of the inherent scenic quality and the user sensitivity of that area. These visual quality objectives describe five degrees of acceptable

alteration of the natural landscape ranging from preservation to maximum modification. Refer to the Glossary for a brief description, or to "National Forest Landscape Management," Vol. 2, Chapter 1, "The Visual Management System," for a more detailed explanation of these different objectives and how they are derived.

The following paragraphs summarize the general visual impacts of each alternative. For a more specific account of the impacts of each alternative, refer to the "Recreation and Visual Resource Specialists Report." Visual impacts would be short term. However, future management activities could extend the impacts for prolonged periods of time.

Alternative 1 would not meet the "Southeast Alaska Area Guide" policy of "recognizing and protecting lands having special values, such as boat anchorages, small boat routes, ferry and tourship routes, recreation beaches..." It proposes very extensive cutting along several saltwater shorelines, such as Tuxekan Passage, West Behm Canal, Traitors Cove, and along part of the ferry route along Clarence Strait. It also proposes extensive cutting around lakes having Forest Service cabins near them and having recognized recreation and/or wilderness values. The resulting visual quality effect in most areas would be maximum modification compared to inventoried VQOs of partial retention in the foreground viewing position and modification in the middleground. Some units in the Salmon Bay and Tuxekan Passage areas would result in unacceptable modification. Visual quality objectives would be met only in the Sumner Strait and Port Protection areas.

Alternative 2 would result in no additional change in visual quality.

Alternative 3 would generally meet the VQOs with minor exceptions. The resulting visual quality in the middleground viewing areas of Exchange Cove and Shakan Bay would be maximum modification rather than the inventoried VQO of modification. The resulting visual quality in the middleground areas of Hatchery Lake and Port Protection would be modification instead of the inventoried VQO of partial retention.

Through lack of cutting, a higher visual quality (generally preservation) than the inventoried VQO of retention or partial retention would be achieved in the Karta, Salmon Bay Lake, and Honker areas. Smaller units and lack of cutting in the foreground would result in a higher visual quality than the inventoried objective of partial retention for the Klu Bay and the

inventoried objective of maximum modification along the Prince of Wales Island road system near Red Bay and Coffman Cove.

Alternative 4 effects would be the same as Alternative 3, except that lower visual quality would result along the Prince of Wales Island road system. It would result in maximum modification in the Coffman Cove area and in modification rather than the inventoried VQO of maximum modification near Red Bay. It would also result in maximum modification rather than the inventoried VQO of partial retention between Naukati and Control Lake. Also in this alternative, a unit proposed on the lower parts of a middleground slope would not meet the inventoried VQO of partial retention from some viewing points on the lake.

Alternative 5 meets the VQO's to the same degree as Alternative 4 in the roaded areas and proposes no harvesting in the roadless areas. This would result in a visual quality closer to partial retention rather than the inventoried VQO of modification along some stretches of the West Behm Canal. Through Shakan Bay, this alternative would meet the inventoried VQO of modification in the middleground. Along the West Coast Waterway just north of Sarkar Cove, this alternative would result in a visual quality of partial retention rather than modification as in Alternative 4. From Sumner Straits, the resulting visual quality will be slightly higher than in Alternative 4, but it would still meet the VQO of partial retention. Other roadless areas not entered with Alternative 5 are not viewed from any sensitive locations, so there would be no change in the visual impact from Alternative 4.

Alternatives 2 to 5 for the most part would recognize and protect the most critical recreation use areas, such as the Forest Service cabins and their associated water bodies, and the visual quality of views from the ferry and cruiseship routes and the more important small boat water routes. Trade-offs were through the IDT process. Therefore, these alternatives meet the Area Guide policies and the 1979-84 operating guidelines for management of the visual resource.

L. Cultural Resources

Impacts on cultural resources come from two sources, direct and indirect. Direct impacts occur when a site is disturbed by a proposed activity. Indirect impacts are such things as disturbance and vandalism resulting from increased human access.

Archeological sites are more likely to be found in some areas than others. Those areas with highest probability are the coastlines. Medium probability areas are the forested island interiors, particularly on old beachlines, lakeshores, and along low reaches of main streams. Low probability areas are alpine and subalpine zones. Certain alpine and subalpine areas have higher probabilities for historical sites, primarily from past mining activities.

The following is a description of each alternative, divided into key areas in relation to known sites. The probabilities for locating sites and direct and indirect impacts on cultural resources are qualitatively described:

Alternative 1--Of all the alternatives, Alternative 1 would have the greatest impact on cultural resources on Prince of Wales Island, because many cutting units are located along the shore. Cultural resource sensitivity areas that would be affected include sale areas adjacent to Kasherof Passage, Clarence Strait, Barnes Lake, Exchange Cove, Coffman Cove, Thorne Bay, Tolstoi Bay, and Twelve-Mile Arm on the east coast and Naukati Bay, Dry Passage, and Tuxekan Passage on the west coast. A traditional Native trail ran between Karta Bay and Klawock (Petroff 1884), and cultural resources associated with this could be affected. Other aboriginal sites, some of which are unverified, could be affected at Dry Passage, Staney Creek, Shaheen, Naukati, Sarkar, Red Bay, Sweetwater Lake, Whale Pass, Thorne Bay, Tolstoi Bay, Karta drainage, and Twelve-Mile Arm (Rabich 1978; Sealaska 1975). Historic sites associated with salteries and canneries could be affected near Red Bay, Salmon Bay Lake, Whale Pass, Coffman Cove, Thorne Bay, Shakan, and Tuxekan (Moser 1902). Historic sites associated with mining could be affected between Karta and Tolstoi Bay, west of Salmon Lake at Twelve-Mile Arm, Dry Passage, and Marble Island (Wright and Wright 1908). On Revillagigedo Island, most of the activities are located inland, but some cultural resources adjacent to Gedney Pass, Behm Canal, and at Indian Point could be affected.

Alternative 2--The decision to take no action would have no impact on cultural resources resulting from timber sale activities.

Alternatives 3 and 4--Impacts from Alternatives 3 and 4 are similar, except, that Alternative 4 would include cutting on a portion of the Kasaan Peninsula. On Prince of Wales Island, both alternatives place most cutting units inland, thus decreasing the potential for direct impacts on cultural resources.

However, cutting units are situated on Marble Island west of Prince of Wales Island. Marble Island has never been thoroughly surveyed for cultural resources, and opening the island to development could increase impacts on any existing cultural resources. Additionally, indirect impacts could occur to all the cultural resources listed in Alternative 1, except for those located near Karta, Sarkar, and Salmon Bay Lake. Cultural resources associated with historic mining activities could be affected on Kasaan Peninsula. On Revillagigedo Island cultural resources could suffer indirect impacts adjacent to Traitors Cove, Neets Bay, Gedney Pass, and at Indian Point.

Alternative 5--Alternative 5, which restricts the sale area to existing roaded areas, would decrease part of the effects on Prince of Wales Island, because some cutting units near Kasaan, Sarkar Lake, and Ratz Harbor are eliminated. Alternative 5 disallows including some of the interior and mountainous terrain in the sale area, but these are probably moderate or low areas of cultural resource sensitivity. Consequently, indirect impacts would generally be the same as in Alternative 4. On Revillagigedo Island, areas of concern include land near Gedney Pass, Neets Bay, and at Indian Point.

Further details on the impacts on cultural resources may be obtained in the "Specialists Report on Cultural Resources."

M. Atmosphere

No slash burning is planned. Operating machinery and logging camps in the area would put some smoke in the air, and during dry weather, some dust would occur along gravel roads. Neither would lead to concentrations great enough to produce any serious air pollution problems. Some noise pollution would be generated by trucks, yarders, and other machinery during timber harvesting and road construction.

VI. EVALUATION OF ALTERNATIVES

LPK has requested that the full 960 MM bm be made available for the 1979-84 operating period. Alternatives 1 and 4 meet this level. Alternatives 3 and 5 provide approximately 70 percent of this amount. Alternative 2 does not provide any harvest.

The need to harvest damaged timber in a timely manner to protect forest resources is addressed in the contract. Harvest of dead or damaged timber is less economically viable than operations harvesting green timber. The short-term economic loss is justified to protect the long-term value of soil, fish, wildlife, cultural, timber, and recreation resources. Since Alternative 2 would preclude timber harvesting, it completely fails to address the salvage issue. Alternatives 4 and 5 would provide for as much harvest of damaged timber as is practical in the areas entered. Because of visual problems, one major blowdown area (Baird Peak) was not entered in Alternative 3 or 4. Alternative 3 would get almost as much damaged timber as Alternative 4, but it would compromise some of the units for recreation values. Alternative 1 did not emphasize damaged timber as a selection criteria because of short-term economics. Consequently, only a minor amount of the damaged timber was proposed for harvest.

The economic viability of an alternative cannot be precisely stated until after an appraisal is done. Based on past experience, a good indicator is the amount of timber scheduled for harvest per mile of road constructed. A harvest of 2 MM bm per mile of system road will generally result in a positive dollar return, except for permanent bridges. With no timber harvest, Alternative 2 has no economic return. To harvest the 960 MM bm, Alternative 4 requires the least number of new roads and would appear to return the most value. However, Alternative 1, with 10 percent more new road mileage, could be competitive or slightly more economical because of lower logging costs as a result of operating in only the best stands and emphasizing relatively short yarding distances using mostly hi-lead. The short-term economics of Alternative 1 would result in later economic and management problems. Alternatives 3 and 5 both require about 50 percent more mileage than Alternative 4 because of having to leave the primary sale area. Alternatives 3 and 5 would probably provide marginal dollar returns.

Wilderness is a national issue. So, it is appropriate that undeveloped areas of national interest be managed according to a broad allocation plan. In this case, the appropriate plan would be TLMP as part of RARE II. Alternatives with units in the Karta, Salmon Bay Lake, Sarkar Lakes, or Honker Divide areas would limit the potential for classified wilderness in these areas. Alternatives 2 and 5 would not have units in these roadless areas or any others. Alternatives 3 and 4 have no units in these areas of national interest, but they would develop other inventoried roadless areas. Alternative 1 would have roads and harvest units in these four areas and in most other inventoried roadless areas.

The design of harvest units to optimize future management would be handled best with Alternatives 4 and 5 in that emphasis would be placed on logical units and windfirm boundaries within the capabilities of present LPK equipment. Alternative 3 would do a slightly poorer job of designing harvest units for future management because of tradeoffs of timber value to protect amenity values. Alternative 1 would place no emphasis on providing for future management. Consequently, future problems with blowdown, accessability, economics, other resources, and operability would result. Since Alternative 2 would provide for no timber harvest, no future management problems would be created.

Alternative 4 does the best job of taking the complete first-entry harvest when operations are in an area. Alternatives 3 and 5 would fail to do this, and in many cases they would increase costs through future re-opening of roads. In some cases, camp moves would also be needed to come back for small first-entry volumes.

An annual harvest of about 250 to 300 MM bm is needed to maintain economic stability on the Ketchikan Area. The 5-year volume of 960 MM bm represents about two-thirds of that amount. Alternative 1 would best maintain the social and economic stability of the Ketchikan Area for the 5-year period. This is because the type of operation follows the pattern of operations for the past 10 years. Alternative 4 would maintain economic stability for the 5-year period and beyond then.

Extention of the public road system to Whale Pass, and Coffman Cove would enhance the social interaction of Prince of Wales Island communities (See Socioeconomic Impacts). Alternatives 3 and 4 would equally affect the social interaction on Prince of Wales Island. Alternatives 1, 3, and 4 would complete most of the Prince of Wales road system. Alternative maps 1, 3, and 4 show which road sections would be completed.

Loss of some jobs in the timber industry with Alternative 3 for 5 years could result in disruption of the economic stability of the Ketchikan Area. Alternative 5 would fail to maintain economic stability more than Alternative 3. Alternative 2 would fail completely to maintain social and economic stability. The resultant loss of 50 percent of the Ketchikan Area jobs would cause complete upheaval in the social pattern and would destroy the timber industry on the Ketchikan Area for an indefinite period.

Alternatives 3, 4, and 5 were prepared in conformance with the policies in the "Southeast Alaska Area Guide." The degree of consideration of each resource varies somewhat and is depicted in relative terms in table 12.

TABLE 12--Relationship of alternatives to evaluation criteria 1/

Evaluation criterion	Rating of Alternative--				
	1	2	3	4	5
1. 960 MM bm from primary area	10	0	7	10	7
2. Timber salvage	2	0	7	8	8
3. Economic viability	10	0	6	10	7
4. Wilderness	0	10	9	9	10
5. Harvest unit design	3	10	7	8	8
6. Intraisland road system	4	0	8	8	4
7. Social and economic stability	9	0	7	10	5
8&9. Conforms to policy and guide-					
lines					
a. Recreation and visual	3	8	9	7	7
b. Soils and water	4	10	8	8	8
c. Fish	3	10	9	7	8
d. Wildlife	3	10	9	7	8
e. Cultural	4	10	7	6	7

1/ The degree to which an alternative satisfies a criterion is shown by 10 for the best and 0 for the least.

VII. IDENTIFICATION OF FOREST SERVICE PREFERRED ALTERNATIVE

Alternative 4 is the preferred alternative. It would adequately meet most criteria. The departures from the primary sale area would be minor, involving three units straddling the sale boundary to facilitate logging system layout design and the addition of the Clam Chance adjacent to El Capitan Passage to integrate the north Prince of Wales Island transportation system.

Alternatives 3 and 5 would not in many cases take the entire first-entry harvest when roads were open and operations were in an area. This would create higher overall costs by requiring a future reopening of roads and in some cases camps. These alternatives would also cause a loss of 900 to 3,000 jobs depending on the alternative and the degree to which induced employment was affected.

Unless mutual cancellation of the contract could be arranged, Alternative 2 would breach the contract and result in costly litigation. In either case, economic and social costs would be high to most of the communities. It would probably close the pulp mill as

wood in transit was used. It is possible that existing independent sales and Canadian imports could keep the pulp mill operating for a short period. The spruce mill in Ketchikan and the Annette hemlock mill would also close or operate intermittently under this alternative for lack of supply. In a community, such as Ketchikan, where alternate employment is not available within commuting distance, the economic effect of this alternative would be severe.

Alternative 1 would meet important criteria from the industry point of view, because harvests of the contract commitment of 960 MM bm could be made in an economically sound manner. Its greatest deficiency is its failure to recognize other important Tongass National Forest interests.

Alternative 4 is the preferred alternative, because it would meet the evaluation criteria more completely than would the other alternatives. Alternative 4 meets industrial needs under the contract and protects Tongass National Forest values.

VIII. MANAGEMENT REQUIREMENTS

Most of the management requirements necessary for implementing this plan are in the LPK contract. Others are in the operating guidelines. Both of these documents are in the Appendix.

Following are some additional requirements not previously included:

Conduct reconnaissance archeological surveys in units where they have not already been done and intensive surveys on areas that appear to yield significant data concerning cultural resources.

Protect any cultural resources discovered during implementation according to the Antiquities Act of 1906, National Historical Preservation Act of 1966, E.O. 11593, 36 CFR 800, and 36 CFR 66.

No sewage discharge into fresh water systems will be permitted. Under the Water Quality Improvement Act (P.L. 91-244) and the 1972 Water Law (P.L. 92-500) Amendments to the Clean Water Act, all domestic sewage waste from logging camps must meet the standards in effect at the time the camp is established. Effluent must meet minimum standards for biochemical oxygen demand, suspended solids, fecal coliform (bacteria), and pH. The discharge facility owner shall apply to the Environmental Protection Agency for a National Pollution Discharge Elimination System permit (Forest Service Manual 7410.3).

A sale area improvement plan will be developed to provide for reforestation and timber stand improvement measures made necessary by the harvest of timber. Actions needed for the rehabilitation of other forest resources such as fisheries or wildlife will be included in the plan. Funds to implement these activities will be collected as part of stumpage receipts and congressional appropriations as provided in the National Forest Management Act.

Conduct IDT review of harvest units or roads before release.

IX. CONSULTATION WITH OTHERS

The Alaska Department of Fish and Game provided one and at times two Ad Hoc advisors to the ID Team. These advisors worked closely with their Forest Service counterparts to provide recommendations which resulted in the formation of various alternatives.

The U.S. Fish and Wildlife Service and The National Marine Fisheries also provided personnel and information particularly regarding location of log transfer sites.

The Ketchikan pulp company personnel were consulted in accordance with the provisions of the Long-Term Sale Agreement.

Also informal discussions were held with members of Tongass Conservation Society and Southeast Alaska Conservation Council.

Additionally, in June 1978, a four-page advertisement was placed in the New Alaskan, a monthly newspaper widely distributed throughout southeast Alaska. An additional 500 copies were mailed or given to individuals who had previously expressed an interest in National Forest Management. The purpose of the advertisement was to inform the public of the scope of the DES and to solicit public opinion on the subject. Forty-two responses were received reflecting a broad spectrum of opinion. The majority favored Alternatives 1, 3, or 4. Although each respondent had a preference for one of the alternatives, they often expressed their analysis of the strengths or weaknesses of each alternative. These are summarized as follows:

Alternative 1--This alternative was viewed as having a low regard for environmental protection and reflecting a single-use concept of National Forest Management instead of multipleuse. It was also seen as being economically viable, protecting jobs, and meeting contract requirements.

Alternative 2--No one considered this a viable option.

Alternative 3--Some respondents felt this alternative adequately protects wildlife, visual, recreational, and other nontimber forest values. Others felt the protection is excessive and would result in adverse economic impacts.

Alternative 4--This alternative was seen as meeting contract requirements with a minimum of adverse environmental and economic impacts. However, the degree of adverse economic and environmental impacts is important and the fear was expressed that this alternative would not meet "Southeast Alaska Area Guide" policy and, depending on a person's viewpoint, that it either gives too much weight to commercial values or not enough.

Alternative 5--This alternative is seen as maintaining high wilderness values and maximum environmental protection but at a cost of not meeting contract requirements or maintaining employment.

X. REFERENCES

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1908. The Ketchikan and Wrangell Mining Districts, Alaska. USDI Geol. Surv. Bull. 347.

Also, specialists working on this plan wrote detailed reports on their subjects. These unpublished reports are available on the following topics by request from the Ketchikan Area office, Forest Service, USDA, Federal Building, Ketchikan, Alaska:

Soils and Watershed
Fisheries
Wildlife
Cultural Resources
Transportation
Recreation and Visual Resources

XI. GLOSSARY

Alevin

A salmoid fish fry on which the yolk sac is still apparent.

Ambient (Surrounding; on all sides; condition or situation surrounding a point or object on all sides.

Habitat

The natural environment or place of existence of a plant or animal.

Landscape Management Terminology

Character Type

An area of land that has common distinguishing visual characteristics of landform, waterforms, and vegetative patterns. Used as a frame of reference to rate physical features of an area as to their degree of scenic quality.

Visual Quality Objectives

Measureable standards for management of the natural landscape. These standards or objectives each describe a different degree of acceptable alteration of the natural landscape.

Preservation

Management activities, except for very low visual impact recreation facilities, are prohibited. Allows only ecological changes.

Retention

Management activities must not be visually evident.

Partial Retention

Management activities can be visible but must be visually subordinate to the characteristic natural landscape.

Modification

Management activities may visually dominate the original characteristic landscape. However, visual characteristics of management activity must borrow from those of natural occurrences within the surrounding area.

Maximum Modification

Management activities may dominate the natural landscape. When viewed from foreground or middleground viewing positions, they may not borrow from the natural landscape. But, when viewed from background positions, the activity must have the visual characteristics of the natural landscape.

Unacceptable Modification

Overall extent of management activity is excessive. Size of activity is poorly related to the scale of landform and vegetative patterns in a characteristic landscape.

Mean Annual Increment

The total volume of a stand of trees divided by the age of the stand.

Niche

A site or habitat supplying the factors necessary for the successful existence of a species.

Site Index

A numerical evaluation of the quality of the land for forest productivity, determined by the rate of growth in height of one or more species of trees.

Threshold Point

The point at which a stimulus is just strong enough to be perceived or produce a response.

V-Notch

V-shaped, steep-walled, incised drainages that cut the sideslopes of glaciated valleys along zones of geologic weakness or post glacial channeling.

XII. APPENDIX

United States Department of Agriculture Forest Service	Contract No. Alofs - 1042
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AGREEMENT TO MODIFY CONTRACT (Timber Sale)

1. It is mutually agreed that the above designated timber sale contract, signed by _____

L. Turcotte, President, Ketchikan Pulp and Paper Co.

_____ of Bellingham, Washington, hereinafter

called the purchaser and by C. M. Granger, Acting Chief, Forest Service for

the United States of America as of the 15 day of December, 1977 6 as heretofore modified, be modified as follows: Add: 35(n) Advanced Transportation Facilities Construction

Purchaser is authorized to construct, during a current five-year operating period, certain transportation facilities, such as: Specified roads, bridges, and other transportation facilities that will be needed for the next ensuing five-year period; provided that the beginning point for estimating these advance facilities shall be from either (a) the terminus shown on the current five-year operating plan, or (b) the terminus of a mutually agree to alternate facility, or (c) a terminus adjusted under provisions of Section 35(b); and provided that any facility approved for construction under terms of this section shall be added to Table A2 before construction begins.

It is provided further that no facility shall be approved for construction under (a) and (b) of this section until such time as the Five-year operating plan for the next ensuing five-year operating period has been approved by the Regional Forester. It is provided further that facilities constructed under terms of this section shall be used only for operations for the ensuing five-year operating period.

See Attachment

Draw a diagonal line with pen and ink in unused portion of form.

2. Pursuant to this mutual agreement, the purchaser hereby agrees to cut and remove timber in strict accordance with all and singular the terms and provisions of the aforesaid contract as herein modified.

IN WITNESS WHEREOF, the parties hereto have executed this modification of contract as of the 1 day of _____, 19____.

UNITED STATES OF AMERICA

By: John A. Sander, Regional Forester
(Signature of approving officer) (Title)

Two witnesses: 2/

(Name of witness)

(Address)

(Name of witness)

(Address)

John A. Sander

Ketchikan Pulp Co. } 3/
Purchaser

P. O. Box 6600
Ketchikan, Alaska 99901 } Purchaser's
Business Address

I, M. R. Pihl, certify that I am the ASST. SECRETARY
Secretary of the corporation named as purchaser herein; that D. L. FINNEY
who signed this contract on behalf of the purchaser, was then VICE PRESIDENT
of said corporation, that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

M. R. Pihl

CORPORATE
SEAL

- 1/ The date approving Forest officer signs this form
- 2/ The signatures and addresses of two witnesses are required if sale is to other than a corporation
- 3/ If contracting party is a co-partnership, the signature should be "XYZ Company, by J. Doe, a member of the firm. If contracting party is a corporation form of signature should be "XYZ Company, by J. Doe, President (or other officer or agent) and the seal of the corporation must be impressed on submitted
- 4/ The certificate must be completed if the purchaser is a corporation
- 5/ If the corporation has no corporate seal that fact shall be stated, in which case a scroll or adhesive seal shall follow the corporate name
- 6/ Delete "as heretofore modified" if not applicable

2400-2 (3/69)

CONTINUATION OF AGREEMENT TO MODIFY CONTRACT - Alofs - 1042, 15
December 1977, Section 35 (n).

Purchaser Credit Limit for facilities constructed under terms of this
section shall be computed by using current unit costs that are in effect
as of the date the facility is added to Table A2.

AGREEMENT TO MODIFY CONTRACT (Timber Sale)

Contract No.

A10fs-1042

1. It is mutually agreed that the above designated timber sale contract, signed by _____

L. Turcotte, President, Ketchikan Pulp and Paper Company

_____ of _____ Bellingham _____, Washington _____ hereinafter
called the purchaser and by _____ C.M. Granger, Acting Chief _____ Forest Service _____
(Name) (Title)

the United States of America as of the _____ 26th _____ day of _____ July 1951 _____, as heretofore modified, be
modified as follows:

Modify table of unit costs by inserting the following items:

Transport Portable Bridges from Seattle to Ketchikan.	\$10.69/Lin. Ft.
Installation of Portable Bridges.	\$69.50/Lin. Ft.
Removal of Portable Bridges.	\$59.00/Lin. Ft.
Land Haul of Portable Bridges.	\$00.10/ft./mile
Water Haul of Portable Bridges	\$00.19/ft./mile

Draw a diagonal line with pen and ink in unused portion of form.

2. Pursuant to this mutual agreement, the purchaser hereby agrees to cut and remove timber in strict accordance with all and singular the terms and provisions of the aforesaid contract as herein modified.

IN WITNESS WHEREOF, the parties hereto have executed this modification of contract as of the 1/ _____ day of _____, 19 _____

UNITED STATES OF AMERICA

By: _____ JOHN A. SANDOR, Regional Forester

(Signature of approving official)

(Title)

Two witnesses: 2/

(Name of witness)

(Address)

(Name of witness)

(Address)

Ketchikan Pulp Company } 3/
Purchaser

P.O. Box 6600

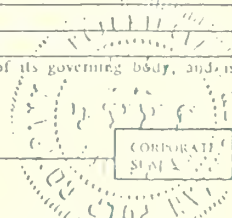
Ketchikan, Alaska 99901

Purchaser's
Business
Address

1/ I, M. R. PIHL, _____, certify that I am the _____ Asst. _____
Secretary of the corporation named as purchaser herein, that Merle A. Mosar

who signed this contract on behalf of the purchaser, was then _____ Vice President
of said corporation, that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is
within the scope of its corporate powers.

M. R. Pihl



- 1/ The date approving Forest officer signs this form.
- 2/ The signatures and addresses of two witnesses are required if sale is to other than a corporation.
- 3/ If contracting party is a co-partnership, the signatures should be "XYZ Company, by John Doe, a member of the firm. If contracting party is a corporation, form of signature should be "XYZ Company, by John Doe, President (or other officer or agent) and the seal of the corporation must be impressed or indicated."
- 4/ The certificate must be completed if the purchaser is a corporation.
- 5/ If the corporation has no corporate seal that fact shall be stated, in which case a scroll or adhesive seal shall follow the corporate name.
- 6/ Delete "as heretofore modified" if not applicable.

2400-9 (3/69)

AGREEMENT O MODIFY CONTRACT
(Timber Sale)

Contract No.

A10fs-1042

1. It is mutually agreed that the above designated timber sale contract, signed by _____

L. Turcotte, President, Ketchikan Pulp and Paper Company

of Bellingham, Washington

hereinafter

called the purchaser and by C. M. Granger, Acting Chief, Forest Service

(Name)

(Title)

for

the United States of America as of the 26th day of July 1951 6/ as heretofore modified, be modified as follows:

Modify section 2(e) by inserting 2(m) and 2(n) after 2(g) and adding new contract sections 2(m) and 2(n) after 2(l).

New contract sections 2(m) and 2(n) are attached.

Draw a diagonal line with pen and ink in unused portion of form.

2. Pursuant to this mutual agreement, the purchaser hereby agrees to cut and remove timber in strict accordance with all and singular the terms and provisions of the aforesaid contract as herein modified.

IN WITNESS WHEREOF, the parties hereto have executed this modification of contract as of the 1/ 8th day of November, 19 76.

UNITED STATES OF AMERICA

By: John A. Sandor Regional Forester

(Signature of approving officer)

(Title)

Two witnesses: 2/

(Name of witness)

(Address)

(Name of witness)

(Address)

3/ Ketchikan Pulp Company Purchaser

P. O. Box-1619

Ketchikan, Alaska 99901

Purchaser's
Business
AddressI, M. R. Pihl, certify that I am the Secretary of the corporation named as purchaser herein; that T. E. Flanagan who signed this contract on behalf of the purchaser, was then President of said corporation; that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.CORPORATE
SEAL 5/

- 1/ The date approving Forest officer signs this form.
2/ The signatures and addresses of two witnesses are required if sale is to other than a corporation.
3/ If contracting party is a co-partnership, the signatures should be "XYZ Company, by John Doe, a member of the firm. If contracting party is a corporation, form of signature should be "XYZ Company, by John Doe, President (or other officer or agent) and the seal of the corporation must be impressed or indicated.
4/ The certificate must be completed if the purchaser is a corporation.
5/ If the corporation has no corporate seal that fact shall be stated, in which case a scroll or adhesive seal shall follow the corporate name.
6/ Delete "as heretofore modified" if not applicable.

2400-9 (3/69)



SAFECO INSURANCE COMPANIES

SAFECO INSURANCE COMPANY OF AMERICA
GENERAL INSURANCE COMPANY OF AMERICA
FIRST NATIONAL INSURANCE COMPANY OF AMERICA
HOME OFFICE SAFECO PLAZA, SEATTLE, WASHINGTON 98185

CONSENT OF SURETY

We, Safeco Insurance Company of America hereby consent to the "Agreement to Modify Contract" dated July 26, 1951.

Timber Sale Contract No. A10fs-1042 is hereby modified as follows:

Modify section 2(e) by inserting 2(m) and 2(n) after 2(c)
and adding new contract sections 2(m) and 2(n) after 2(l).

Signed, sealed and dated this 7th day of December, 1976.

SAFECO INSURANCE COMPANY OF AMERICA

By: 
Theo. W. Backmann, Attorney-in-fact



POWER OF ATTORNEY

SAFECO INSURANCE COMPANY OF AMERICA
GENERAL INSURANCE COMPANY OF AMERICA
HOME OFFICE SAFECO PLAZA
SEATTLE, WASHINGTON 98185

No. 3065

KNOW ALL MEN BY THESE PRESENTS:

That Safeco Insurance Company of America and General Insurance Company of America, each a Washington corporation, does each hereby appoint

----- ROBERT A. LABOW; WILLIAM H. SCHLENKER; JOHN F. SOLON; THEO W. BACKM
CATHY HOFFERBER, Seattle, Washington -----

its true and lawful attorney(s)-in-fact, with full authority to execute on its behalf fidelity and surety bonds or undertakings and other documents of a similar character issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, Safeco Insurance Company of America and General Insurance Company of America have each executed and attested these presents

this 15th day of July, 19 74.

W D Hammersla
W D HAMMERSLA SECRETARY

Gordon H. Sweeney
GORDON H SWEENEY PRESIDENT

CERTIFICATE

Extract from Article VI, Section 12, of the By-Laws of SAFECO Insurance Company of America
and of General Insurance Company of America:

"Article VI, Section 12, - FIDELITY AND SURETY BONDS . . . the President, any Vice President, and the Secretary shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to execute on behalf of the company fidelity and surety bonds and other documents of similar character issued by the company in the course of its business . . . On any instrument making or evidencing such appointment, the signatures may be affixed by facsimile. On any instrument conferring such authority ~~for~~ on any bond or undertaking of the company, the seal, or a facsimile thereof, may be impressed or affixed or in any other manner reproduced; provided, however, that the seal shall not be necessary to the validity of any such instrument or ~~undertaking~~."

Extract from a Resolution of the Board of Directors of SAFECO Insurance Company of America and
of General Insurance Company of America adopted July 28, 1970:

"On any certificate executed by the Secretary or an assistant secretary of the Company setting out,

- (i) The provisions of Article VI, Section 12 of the By-Laws, and
 - (ii) A copy of the power-of-attorney appointment, executed pursuant thereto, and
 - (iii) Certifying that said power-of-attorney appointment is in full force and effect,
- the signature of the certifying officer may be by facsimile, and the seal of the Company may be a facsimile thereof."

I, Wm. Hammersla, Vice President and Secretary of SAFECO Insurance Company of America and of General Insurance Company of America, do hereby certify that the foregoing extracts of the By-Laws and of a Resolution of the Board of Directors of these corporations, and of a Power-of-Attorney issued pursuant thereto, are true and correct, and that both the By-Laws, the Resolution and the Power-of-Attorney are still in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of each corporation

this 7th day of December, 19 76.



W D Hammersla
W D HAMMERSLA SECRETARY

2(m) - Transfer of Purchaser Credit. Upon Forest Service approval of Purchaser's written request, unused Effective Purchaser Credit earned after December 16, 1975, shall be transferred from this contract to Purchaser's other timber sale contracts within the same National Forest (36 CFR 221.7).

Effective Purchaser Credit transferred from this contract subsequently determined to be ineffective under terms of this contract shall be replaced by cash payments. 0% of the maximum purchaser credit limit as approved on table A-2 cannot be transferred from this sale and must be applied to the timber harvested from the withdrawn areas.

Purchaser Credit transferred to this contract from other contracts may be used to meet current or subsequent charges for timber subject to 2(g). Transferred Purchaser Credit may not be used to cover payments for Base Rates, Required Deposits, charges for timber harvested on areas withdrawn under PL 92-203 and 94-204, and \$1,273,950 needed to accomplish sale area betterment work. Transfer of Purchaser Credit to or from Timber Sale Account shall be made monthly, or at longer intervals, as requested by Purchaser.

Transfers of less than \$500 or of amounts needed to meet unfulfilled payment obligations under 2(g)(1) will not be approved.

2(n)-Use of Deposits. Notwithstanding 2(k), deposits made under this contract may be used by Forest Service in carrying out collection rights authorized by Claims Collection Act when Purchaser Credit has been transferred to this contract. The use of such deposits shall be limited to the amount of Purchaser Credit which has been transferred and is further limited to claims arising under the contract from which the Purchaser Credit was transferred.

AGREEMENT TO MODIFY CONTRACT (Timber Sale)

Contract No.
A10fg-1042

1. It is mutually agreed that the above designated timber sale contract, signed by _____
L. TURCOTTE, President, Ketchikan Pulp and Paper Company

_____ of Bellingham, Washington, hereinafter
called the purchaser and by C. M. GRANGER, Acting Chief, Forest Service, for
(Name) (Title)
the United States of America as of the 26th day of July 1951, as heretofore modified, be
modified as follows.

The following changed contract sections are modified to read as shown in the following attachment which is made a part of this agreement:

Section 1(c)	Section 5	Section 18	Section 35(c)	Section 35(l)
Section 1(g)	Section 5(a)	Section 19	Section 35(d)	Section 35(m)
Section 2(a)	Section 6(e)	Section 21(a)	Section 35(e)	Table A1
Section 2(f)	Section 7	Section 21(b)	Section 35(f)	Table A2
Section 2(g)	Section 8	Section 26	Section 35(g)	Table of Unit Costs
Section 2(j)	Section 9	Section 30	Section 35(h)	
Section 2(k)	Section 9(a)	Section 35	Section 35(i)	
Section 2(l)	Section 10	Section 35(a)	Section 35(j)	
Section 4	Section 15	Section 35(b)	Section 35(k)	

Draw a diagonal line with pen and ink in unused portion of form.

2. Pursuant to this mutual agreement, the purchaser hereby agrees to cut and remove timber in strict accordance with all and singular the terms and provisions of the aforesaid contract as herein modified.

IN WITNESS WHEREOF, the parties hereto have executed this modification of contract as of the 1st day of October, 1951.

UNITED STATES OF AMERICA

By: _____
(Signature of approving officer)

Chief
(Title)

Two witnesses: 1/

(Name of witness)

(Address)

(Name of witness)

(Address)

Ketchikan Pulp Company

P.O. Box 1619

Ketchikan, Alaska 99901

3/

Purchaser's
Business
Address

I, D. L. Finney, certify that I am the Vice President

XXXX of the corporation named as purchaser herein; that T. E. Flanagan
who signed this contract on behalf of the purchaser, was then President
of said corporation, that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is
within the scope of its corporate powers.

CORPORATE
SEAL

- 1/ The date approving Forest officer signs this form
- 2/ The signatures and addresses of two witnesses are required if sale is to other than a corporation
- 3/ If contracting party is a partnership, the signatures should be "XYZ Company, by John Doe, a member of the firm. If contracting party is a corporation, form of signature should be "XYZ Company, by John Doe, President (or other officer or agent) and the seal of the corporation must be impressed on indicated
- 4/ The certificate must be completed if the purchaser is a corporation
- 5/ If the corporation has no corporate seal that fact shall be stated, in which case a scroll or adhesive seal shall follow the corporate name
- 6/ Delete "as heretofore modified" if not applicable

2400 9 (3/69)

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

TIMBER SALE AGREEMENT

(As Modified June 6, 1956, February 9, 1957, June 19, 1964 and
October 1, 1975)

S

SALES, R-10 Tongass
Ketchikan Pulp & Paper Co., 7/26/51
Contract No. A10fs-1042

The parties entering into this agreement pursuant to the Act of June 4, 1897 (30 Stat. 35) as amended, and the Act of August 8, 1947 (Public 385, 80th Congress, 1st Session) are acting under the following conditions and considerations: (1) the Forest Service, acting in behalf of the United States of America, is deeply interested in encouraging and bringing about the industrial development of Alaska; (2) the purchaser proposes to establish a new enterprise for the utilization of forest products, including a pulp mill, and the development of water supply with associated facilities within the boundaries of Pulp timber Allotments E, F and G, Tongass National Forest in Southeast Alaska; (3) both parties recognize that this pioneering undertaking, involving a substantial long-term investment by the purchaser, will be accompanied by unusual risks due to many unknown conditions that may be encountered at the isolated site and during operations, great distance from markets, present day costs of establishing the necessary facilities; (4) the Chief, Forest Service, having due regard for the interests of the United States and for the protection of the natural resources of Alaska, wishes to facilitate the establishment of such new industry by the purchaser and the operation of the industry on a commercially sound and permanently economical basis; (5) it is the policy and intention of the Forest Service through sustained yield management of the Tongass National Forest, to afford an opportunity to purchase supplies of timber for permanent operation of such enterprise as is established in accordance with the terms of this agreement for the utilization of the timber embraced in this agreement.

NOW, THEREFORE, it is agreed as follows:

That the contract of July 26, 1951 is a sale of the timber located within the area shown upon the maps attached to said contract, and by reference made a part thereof, without regard to the quantity of timber thereon except that said contract provides that if the timber available for cutting within said area is insufficient for full scale operation until June 30, 2004 of the purchaser's pulp plants referred to in Section 1(h) of said contract at the capacities contemplated in Section 1(h) of said contract, additional timber will be allotted by the Forest Service from pulp timber allotments (E), (F), and (G) of the Tongass National Forest to meet such needs of such plants for the period ending June 30, 2004, provided that the Forest Service is not obligated to make available for cutting from such additional allotments more timber than a total of 1,500,000,000 cubic feet of material available for cutting from all areas, all as set forth in said contract, said contract being subject to all other conditions and reservations stated therein.

Modification as of 10/01/75 in script type.

That for the purpose of determining the stumpage payments to be made under the contract, and determining if the total quantity of timber within the area shown on said maps equals at least 1,500,000,000 cubic feet, and for all other contract purposes, all reference to cubic feet in said contract shall be converted into board feet at the ratio of 5.5 board feet for each cubic foot.

Sections 2(a), 2(f), and 5(a) of the original agreement shall be modified; Section 6 of said original agreement shall be modified; Sections 6(a), 6(b), 6(c), 6(d), 6(e), 6(f), 6(g) and 6(h) shall be added thereto; and Section 7 shall be modified, all as hereinafter set forth.

Should any clause or provision of this Modification of Agreement be adjudicated void by any court of final resort, such decision shall not be deemed to affect the validity of the Timber Sale Agreement of July 26, 1951, and said agreement shall remain in full force and effect.

We further agree that if this application is approved, a certain bond executed by us as principal on the 26th day of July 1951, and approved by the Acting Chief, Forest Service, on the 20th day of August 1951, which was given to the United States of America to insure faithful compliance with the terms of the aforesaid agreement, shall bind us and our heirs, executors, administrators, successors, and assigns in the same manner as if said modification had been included in the original agreement, to insure compliance with which said bond was given.

Except as modified hereby, all other provisions of the contract of July 26, 1951, shall remain in full force and effect.

Description of Timber.--1. The Ketchikan Pulp & Paper Company, a corporation organized and existing under the laws of the State of Washington, having an office and principal place of business at Bellingham, State of Washington, hereinafter called the purchaser, hereby agrees to purchase from an area definitely designated on the attached maps which are a part of this agreement, within Pulp timber Allotments E, F and G of the Tongass National Forest, at the rate or rates and in strict conformity with all and singular the requirements and conditions hereinafter set forth, all timber marked or designated for cutting by a Forest Officer, merchantable as hereinafter defined for pulpwood, sawlogs and other primary forest products customarily produced in Alaska.

Timber upon valid claims and all timber to which there exists valid claim under contract with the Forest Service is exempted from this sale. The estimated amount to be cut under the methods of marking described in Section 4 is 1,500,000,000 cubic feet of western hemlock, Sitka spruce, western red cedar, Alaska cedar, and other species of timber, more or less.

Additional
Areas

1(a). In event the quantity of timber available for cutting within the above described area is insufficient for full scale operation until June 30, 2004 of the purchaser's pulp plants hereinafter mentioned at the capacities contemplated in Section 1(h) of this agreement, the Regional Forester shall designate additional cutting areas within Pulptimber Allotments E, F and G to meet such needs of such plants for the period ending June 30, 2004, PROVIDED, that the Regional Forester is not obligated to make available for cutting more than the 1,500,000,000 cubic feet of material covered by this agreement, and PROVIDED FURTHER, that the Regional Forester may sell timber from time to time in such amounts from those portions of Pulptimber Allotments E, F and G not included in the areas hereinabove described which in his judgment are not needed to meet the terms of this agreement, and PROVIDED FURTHER, that inability of the United States to fulfill the obligations set out in this paragraph because of loss of timber within any portion of Pulptimber Allotments E, F and G by fire, windthrow, insect or disease epidemics shall not entitle the Purchaser to the right to cut timber in any areas outside of Allotments E, F and G, or to any other compensation.

5-Year
Operating
Periods

(b). After an initial operating period ending June 30, 1964, operations under this agreement shall be divided into operating periods of 5 years beginning July 1, 1964 and at 5-year intervals thereafter. For each such 5-year operating period, logging units will be selected and logging boundaries will be determined, stumpage prices will be redetermined and modification of this agreement may be made, all in accordance with the terms and conditions hereinafter stated.

Selection
of
Logging
Units
for
5-Year
Operating
Periods

1(c). Not less than *two years* in advance of each 5-year operating period the purchaser shall select logging units for cutting in the ensuing 5-year period. Timber cover and topographic maps of the units selected shall thereupon be submitted to the Regional Forester who may require a substitution for any selected unit if he deems such action necessary to prevent loss of rapidly deteriorating timber killed or damaged by fire, insects or windthrow or to protect other important National Forest interests. The location of the unit boundaries and of the lines of any interspersed patches of log-grade or poorly accessible timber, as drawn by the purchaser to exclude material he considers economically unoperable during the ensuing 5-year period, shall be subject to review and adjustment by the Regional Forester. *Not less than one year in advance of each five-year operating period the Regional Forester will notify purchaser of tentative decision on acceptability of units selected for cutting in the ensuing five-year operating period.* Should at any time during the life of this agreement, a fire of major proportion, a serious windstorm, extremely damaging insect or disease attacks, or other catastrophe of great moment, befall the timber included in this agreement, the Regional Forester may require substitution of the logging units to be cut during the then current 5-year operating period and require the purchaser to readjust his current logging activities for the purpose of salvaging such killed or injured timber.

1(d). The Regional Forester will not require cutting of timber stands on any logging unit even though previously selected for such period nor require modifications of this agreement under the provision of Section 2(e) which will result in average delivered costs of logs to the purchaser's pulp mill, as determined by the Regional Forester which would place the purchaser in a disadvantageous position with respect to similar enterprises in the Puget Sound region: PROVIDED, that for the initial and two subsequent operating periods ending June 30, 1974 the weighted average estimated costs of pulp logs delivered at the purchaser's pulp plant, including stumpage and payments under Section 2(f), separately for each operating period, shall not be higher than a percentage to be determined as hereinafter stated of the weighted average delivered costs at manufacturing plant of hemlock logs of similar quality purchased by mills of the Puget Sound region, which percentage shall be determined by the Regional Forester as being equitable to keep the purchaser's operation in a competitive position with similar enterprises located in the Puget Sound region, but said percentage shall not be less than 50 nor more than 75; and PROVIDED FURTHER, that for the initial operating period ending June 30, 1964 said percentage is fixed at 60.

Unless changes are made by mutual consent of the Regional Forester and the purchaser, logging operations during the initial operating period ending June 30, 1964, shall be conducted on the areas shown on the attached maps and designated "Logging Units for Operation for the Operating Period ending June 30, 1964."

If the purchaser believes that any unit or part thereof laid out for logging during the initial operating period ending June 30, 1964 or during any ensuing 5-year period does not possess the characteristics necessary to fulfill the above mentioned provisions as to log costs, he shall be entitled on request to the Secretary, in connection with an appeal under Section 25 of this agreement, to have any such unit or part thereof inspected by a board of three qualified logging operators or logging engineers, of which one member shall be selected by the purchaser, one by the Secretary, and the third by the other two members. The board shall submit to the Secretary its recommendations of any substitution in the units selected for logging or any changes in the location of unit boundaries or of the lines of interspersed patches of unoperable timber which it deems necessary to bring the log costs in line as closely as possible with the intention expressed in this subsection, which recommendation will be considered by the Secretary.

1(e). The Regional Forester may grant the use of timber from portions of the sale area to others than the purchaser for local ultimate use in Southeast Alaska to the extent of not more than two percent of the estimated total stand in any logging unit, if in the judgment of the Regional Forester, the operations of the purchaser will not be materially interfered with thereby.

Timber
for
Local
Use

Reservationsl(f). The Regional Forester may reserve from cutting strips and for Scenic blocks of timber having special scenic value in connection with water Purposes courses, recreation sites and highways, or strips or blocks which and cannot be logged without causing substantial harm to salmon streams and Salmon or lakes.

Protection

EXPORT
RESTRICTION

1(g). Veneer logs, sawlogs, pulplogs, cordwood and other primary forest products shall not be transported for manufacture outside the State of Alaska without consent of the Regional Forester, but such consent will not be withheld for the export of such products having special value so long as in the opinion of the Regional Forester competitive markets for such special products do not exist within Alaska.

Plant
Con
Construction

1(h). Prior to July 1, 1954 the purchaser or interests with which he is affiliated, shall install at some point within the boundaries of Pulptimber Allotments E, F and G as shown on attached map, a pulp manufacturing plant with a designed capacity of not less than 300 tons per day and may be increased to 525 tons per day by not later than July 1, 1964. Prior to July 1, 1952, the purchaser shall make a satisfactory showing to the Regional Forester that the principal items of machinery and equipment for such plant have been placed on order with manufacturers. Failure of the purchaser to make the showing or to install the plant, as provided for above, shall render this agreement subject to cancellation in the discretion of the Chief, Forest Service hereinafter called the Chief; PROVIDED, however, if in the judgment of the Chief the failure to make the showing or to complete the plant has been caused by an act or acts of an agent of the United States or by other circumstances beyond the control of the purchaser, and if the purchaser has exercised due diligence in trying to meet the conditions specified, the Chief shall grant a reasonable extension of time within which to meet these conditions, but financial inability shall not be considered to be a circumstance beyond the control of the purchaser.

Pollution
Control

1(i). The purchaser shall make such showing as may be required by the Chief, Forest Service, in respect to adequate measure for control of disposal of plant effluents in the design, processing methods, and operation of the pulp plant described in Section 1(h) of this agreement.

Initial
Rates

2(a) Payments. The purchaser hereby agrees to pay to the Treasurer of the United States, or such other depository or officer as shall hereinafter be designated, to be placed to the credit of the United States, for the timber at the following rates for stumpage:

For all timber scaled or measured after date of this amendment and prior to July 1, 1964, at the following rates:

\$1.99 per M board feet for spruce logs
\$1.57 per M board feet for hemlock logs
\$1.50 per M board feet for cedar logs
\$2.00 per M board feet for logs of other species.

1.5 cents per linear foot for piling or poles
95 feet in length.

1.0 cents per linear foot for piling or poles
95 feet and under in length.

PROVIDED, that timber which has been assembled into completed rafts and which has not yet been scaled on the date reappraised rates go into effect, shall be marked or otherwise identified and shall be charged for when scaled at the rates in effect the day before the reappraised rates become effective..

M. ~~Material~~ unmerchantable on account of defect (net scale in percent of gross scale) as hereinafter defined may be removed without charge in the discretion of the Regional Forester. *Material unmerchantable because of size as hereinafter defined, removed at the option of the Purchaser, may be removed without charge at the discretion of the Regional Forester.*

Adjusted
Rates

For all timber scaled or measured during the period beginning July 1, 1964, and ending June 30, 1969, and for all timber scaled or measured within each succeeding 5-year period thereafter, at such rates as shall be designated by the Chief in advance of the beginning of each period to apply during the period.

2(b). The Chief shall before July 1, 1964, and before July 1 of each fifth year thereafter during the time this agreement remains in force, make a reappraisal and designate the rates per unit of measures that shall be paid by the purchaser for the several classes of material scaled or measured during the 5-year period next following each such date.

The stumpage rates fixed as the result of such reappraisals shall be equitable to the purchaser in comparison with the rates on other pulpwood sales on the Tongass National Forest and shall be consistent with the provisions of Section 1(d) of this agreement.

If the purchaser believes that the stumpage rates designated by the Chief under the provisions of Sections 2(b) and 2(c) of this agreement do not conform with the purposes and intentions of said Sections, he shall be entitled on request to the Secretary, in connection with an appeal under Section 25 of this agreement, to have such rates

reviewed by a board of three qualified logging operators or logging engineers of which one member shall be selected by the purchaser, one by the Secretary, and the third by the other two members. The board shall submit to the Secretary its recommendation of any changes in the designated stumpage rates which it deems to be necessary to make said rates conform with the purposes and intentions of said Sections, which recommendations will be considered by the Secretary.

At least 60 days before each date for adjustment of stumpage rates the Regional Forester shall notify the purchaser of the reappraised rates and contract modifications which he has tentatively decided to recommend to the Chief and shall invite the purchaser to make any presentations desired. The recommendation of the Regional Forester to the Chief shall be accompanied by the purchaser's presentations on any matters on which agreement has not been reached.

Emergency
Reap-
praisals

2(c). Upon receipt of a written application from the purchaser wherein it is shown that because of substantial changes in market or other economic conditions since the last reappraisal, current rates are unreasonably high, the Chief of the Forest Service in his discretion may redetermine and establish the stumpage rates and designate a date when the rates as redetermined shall be effective, which date shall be the earliest practicable and in any event within six (6) months of the date of application.

Any stumpage rates redetermined upon application to the Chief shall be determined in accordance with the method and under the terms above set forth, and shall apply only during the remainder of the 5-year period then current.

Minimum
Adjusted
Rates

2(d). In no event, however, shall the stumpage rates for products from material the utilization of which is required by this agreement as established at the beginning of any 5-year period, or upon application from the purchaser, be less than the rates named in the advertisement through which the timber covered by this agreement was offered for sale.

Contract
Modifi-
cations

2(e). Subject to the provisions of Section 1(d) of this agreement, it is further agreed that at the date for any adjustment of stumpage rates the Chief may require such modification in the Sections numbered 2(f), 2(g), 4, 5(a), 6, 7, 9, 12, 13, 14, 15, 16 and 17 in this agreement as are necessary, in his judgment, to protect the interests of the United States. Such modifications shall be limited to requirements that apply or are to be made applicable to the then current pulp-timber sale contracts in Southeastern Alaska. Any additional operating costs entailed by such modifications shall be taken into consideration as a factor in reappraisals.

Deposit
for
Stand
Im
provement

2(f). *Payments for required deposits for Sale Area Betterment are included in the rates established for stumpage.*

2(g). For all timber included in this contract for which stumpage payments and required deposits have not been made in full by deposit with bid, payments shall be made in accordance with (1) or (2) as follows:

(1). Payments for stumpage and for required deposits shall be made in advance of cutting as called for by the Forest Service and, unless otherwise provided herein the amount requested at any one time shall be not less than Twenty Four Thousand Dollars (\$24,000), except that just before the completion of the sale or before a period when cutting operations are to be suspended for at least three (3) months, such amount may be reduced by the Forest Service. If advance payment is not received within fifteen (15) days of request therefor or if at any time the advance balance is reduced to Eight Thousand Dollars (\$8,000), the Forest Service may suspend all or any part of the operations under this contract until the requested payment is received. The purchaser shall not be required to have an advance balance of more than Seventy Two Thousand Dollars (\$72,000) at any time.

(2). Payment for stumpage and required deposits may be made subsequent to cutting if the purchaser furnishes an acceptable bond in an *adequate amount as determined by the Forest Service* guaranteeing payment for such stumpage and required deposits, or in lieu thereof deposits in a Federal depository through the Regional Fiscal Agent negotiable securities of the United States having a face value in like amount of dollars and accompanied by a power of attorney and agreement authorizing the bond-approving officer to sell or collect such securities if payment is not made within fifteen (15) days of request thereof, provided that the timber cut in advance of payment under this authority shall not exceed in contract price for stumpage and required deposits the amount of the bond or deposited securities. Provided, that if the rate of cutting is temporarily increased, timber in excess of the bond amount may be cut if the purchaser makes deposit of cash to cover the estimated value of such timber and required deposit. Such bond or deposited securities shall for such purpose be in lieu of the regular bond, cash deposit or negotiable securities given to guarantee performance of the contract. When such advance cutting is done, payments shall be made as called for by the Forest Service in amounts equal to the contract price of the timber scaled, and the required deposits due, subsequent to that for which the last payments were made: *PROVIDED*, That if at any time payment is not received within fifteen (15) days of request therefor the Forest Service may suspend all or any part of the operations under this contract until payments of the contract price of all timber cut but not paid for, and the

required deposits due, are received, and may take such action as is necessary to collect such payments from the surety under the bond or by sale or collection of the securities guaranteeing payments. In the event the purchaser fails to make payment and collection is obtained from the security or from the sale of collection of the deposited securities, the Forest Service may thereafter at its election require the purchaser to make payments in advance of cutting.

2(h). Payments for liquidated damages, pursuant to Sections 11 and 12, shall be made when requested by the Forest Service.

2(i). The Forest Service is hereby authorized by the purchaser to make transfers currently of balances on deposit between the separate accounts for stumpage, liquidated damages, and sale area betterment, whenever necessary to avoid deficits in individual accounts.

2(j). *Cooperative Deposits.* On a basis of cooperation or assistance (16 USC 572) and by a written agreement, Forest Service shall perform all or portions of the work which purchaser is obligated to perform under this contract, as well as furnish other services in connection with activities under this contract. When Forest Service is to perform such work, purchaser shall make one or more deposits to cover the estimated cost of said work. On request of purchaser, Forest Service shall render monthly accounts as may be specified in such agreement.

2(k). *Use of Deposits.* Forest Service shall receive and apply deposits made under Section 2(j) only to meet purchaser's obligations under this contract, unless otherwise authorized by purchaser.

2(l). *Purchaser Credit.* "Purchaser Credit" is a credit earned by purchaser's construction of Specified Roads, bridges and other transportation facilities, and is computed and recorded as provided in 35(j). "Purchaser Credit Limit" is the maximum amount of such credit which shall be recognized hereunder and shall never exceed the listed total estimated cost, based on survey and design of project segments in A2, attached hereto, which may be adjusted pursuant to 2(b), 2(c), 35(b), 35(c), 35(d), 35(f), 35(g), 35(h), and 35(i).

In addition "Purchaser Credit Limit" shall be further limited to the total value of the difference between current contract rates and minimum adjusted rates as established in accordance with Section 2(d), as applied to the remaining volume of timber to be scaled on the sale area.

"Effective Purchaser Credit" means unused Purchaser Credit which does not exceed current stumpage rate value minus minimum adjusted rate value.

"Minimum Adjusted Rate Value" is the sum of the products of minimum adjusted rates and estimated volume by species of cut but unscaled timber. Effective Purchaser Credit shall be considered equivalent to cash for advanced deposits limited to the prohibition on using Purchaser Credit for minimum adjusted rate charges.

Purchaser Credit earned but not credited in one 5-year operating period will be credited in subsequent 5-year operating periods.

3(a). Period of Contract. The purchaser may begin the cutting and removal of timber after the execution and approval of this agreement and shall begin such operations not later than the date of completion of the initial installation of the purchaser's pulp manufacturing plant, as specified in Section 1(h) hereof, and unless extension of time is granted, all timber which the purchaser is obligated hereunder to cut and remove shall be cut and removed and the requirements of this agreement satisfied on or before June 30, 2004; PROVIDED, that the purchaser's rights shall not extend to the timber on any logging unit on which operations have not been started on June 30, 2004.

Periodic
Cuts

3(b) Unless such amounts are reduced in writing by the Regional Forester, at least three-fourths of the pulpwood requirements of the pulp manufacturing plant and other processing facilities operated in connection with this Sale shall be cut from the areas covered by this agreement during the period prior to July 1, 1964, and during each 5-year period subsequent to that date.

3(c). Unless such amounts are changed in writing by the Regional Forester, the annual average amount of pulptimber or its equivalent in all forms of material to be cut and removed from such areas during the period beginning July 1 of the year following completion of the said pulp mill and ending June 30, 1964, shall be a minimum of 5,000,000 cubic feet and a maximum of 35,000,000 cubic feet and for each successive 5-year operating period thereafter; PROVIDED, that if the pulp manufacturing plant mentioned in Section 1(h) hereof shall have been installed and if in the judgment of the Chief the purchaser shall have exercised due diligence in his logging operations, but, because of some act or acts of an agent of the United States or because of other circumstances beyond his control is unable to cut the minimum amount of timber from the sale area or areas required by the terms of this section, the Regional Forester shall reduce the amount to be cut from that specified heretofore in this section to the amount actually cut.

Designation
of
Timber

4. Marking. Timber shall be designated for cutting as follows: The exterior boundaries of each logging unit to be cut by the purchaser shall be marked on the ground by the Forest Service in advance of the start of logging operations on the unit. All single seed trees and groups of seed trees selected by the Forest Officer in charge, timber on recreation sites and strips and blocks of timber along thoroughfares,

streams, and lakes to be held intact, and interspersed patches of timber within the logging unit which are classed as unmerchantable or inaccessible shall be plainly marked for reservation from cutting and such marking shall be done sufficiently in advance so as not to interfere with or delay cutting by the purchaser. Within the areas to be thus designated and subject to exceptions set forth in this section, all live trees merchantable as defined in Section 5, and cull live trees over 15 feet in height and 12 inches DBH, are to be cut, and the purchaser shall remove all merchantable material from the sale area. PROVIDED, that not more than ten percent (10%) of the merchantable volume on the area to be cut over may be reserved for seed trees; and PROVIDED FURTHER, that subject to the provisions of Section 1(d) of this agreement, the Regional Forester may designate areas for cutting by tree selection, or other methods, to promote growth, obtain salvage or to protect scenic areas where tractor or other methods of logging are feasible.

5. Merchantability Standards. Definition of Merchantable Tree and Product:

MINIMUM SPECIFICATIONS - ALL SPECIES					
Definition of Merchant- able Tree	: Product Units :	:	:	Diameter inside :	Net Scale in
	DBH :	Per Tree :	Length :	bark at small :	% of Gross
	Inches :	Number :	Feet :	end - Inches :	Sales
	:	:	:	:	:
	:	:	:	:	:
	12	1 log	12	6	33-1/3
	:	:	:	:	:

Definition of Merchantable Log: 5(a). All logs are merchantable which are not less than 12 feet long, at least 6 inches in diameter inside bark at the small end, and after deductions for defect contain a net scale of at least 33-1/3 percent of their gross scale.

6. Scaling. Material shall be so handled by the purchaser that it can be scaled or measured economically by the methods in general use by the Forest Service in Alaska, and the Forest Service shall so direct the work of such scaling or measuring that it will hinder or delay the operations of the purchaser as little as practicable under these methods. The term "scaling" as used herein, may include scaling by log rule, measuring, linear measuring, counting, weighing, tree measuring before felling, or any other mutually satisfactory method of volume determination. Unless other methods of scaling are mutually agreed to in writing in advance, timber included in this sale will be scaled as set forth herein.

Title to all timber included in this agreement shall remain in the United States until it has been paid for, felled and scaled or measured.

6(a). All logs shall be scaled by the Scribner Decimal C Log Rule, in accordance with the Forest Service rules for scaling logs in the Pacific Northwest Region and Alaska.

6(b). Material presented for measurement as piling or poles shall be measured in linear feet.

6(c). Any pulpwood cut in the form of cordwood instead of in logs, shall be measured in cords of 128 cubic feet of stacked wood, and the number of cords converted into board feet at the ratio of one cord equaling 500 board feet unless or until as the result of actual measurements, the Regional Forester and the purchaser shall have agreed on the use of some other ratio.

6(d). By mutual agreement in writing between the purchaser and the Regional Forester the scale of logs may be determined by a designated scaling bureau, PROVIDED, that either the Company or the Forest Service reserves the right to check-scale the work of scaling bureau scalers and when such check-scales show a variance in scale in excess of plus or minus 5 percent, either party may request the designated scaling bureau to make a rescale if logs are being scaled in assembled rafts or a check-scale in all other cases; the parties agree to accept the Bureau's rescale volume as the final volume for such raft or rafts, whenever the Bureau's rescale volume shows a variance in excess of plus or minus 5 percent.

Determination of scale by the Bureau may be for all or part of timber cut and may be terminated by the Regional Forester whenever services rendered are deemed unsatisfactory, or by the purchaser at any time after thirty (30) days notice in writing to the Regional Forester.

During the period agreement to use Bureau scaling is in force, scaling shall be performed at places acceptable to the Bureau and the Forest Service. The purchaser agrees to cooperate with the Forest Service in providing conditions satisfactory for making check-scales by a Forest Service check-scaler, and to hold designated rafts containing National Forest logs for rescaling or check-scaling by the Bureau whenever a Forest Service scale of said raft indicates a variance in excess of 5 percent from the original Bureau scale. Methods customarily employed by the Scaling Bureau may be used to signify the completion of scaling in lieu of stamping by the Forest Service.

6(e). All logs cut under this agreement shall be branded with a log brand registered with the State of Alaska, or shall be otherwise plainly marked in such manner as directed by the Forest Service for easy identification and shall not be removed from the place agreed upon for scaling until scaling has been completed. Any log brand assigned to logs of this sale area will not be used on logs from any other sale area or on logs from any area in other ownership until such brand has been released in writing by the Forest Service.

6(f). Log rafts shall be identified in a manner satisfactory to the Forest Service and the purchaser or his subcontractors shall execute log raft receipt forms, or provide other records as required by the Forest Service to account for log rafts in transit or storage.

6(g). The purchaser agrees to provide the Forest Service at approximately monthly intervals, statements showing the identification, and location of log rafts in storage or in transit and log rafts which have been consumed by the mill during that period.

6(h). When scaling is performed at locations other than on the sale area, the purchaser shall be responsible for loss of logs from the time of removal from the sale area until scaled, and unless any resultant loss as determined by the Forest Service involves small amounts and is justified by existing conditions, lost logs shall be paid for at the current price including stumpage and special deposits. Determination of volume and species for any such log losses shall be made by applying the average net volume per log and percentage species distribution as determined by the Forest Service to be equitable.

Scaling
Length

7. Maximum Scaling Length. The maximum scaling length of logs shall be 40 feet; greater lengths will be scaled as two or more logs. There shall be allowed for trimming not more than 12 inches for logs 40 feet and under in length and not more than 2 inches for each additional 10 feet in length.

8. Logging. As far as may be deemed necessary for the protection of National Forest interests, the plan of logging operations on each of the logging units of this sale area or areas shall be approved by the Forest Officer in charge. When operations are begun on any logging unit, the cutting on that unit shall be completed to the satisfaction of the Forest Officer in charge before the logging equipment is removed from the unit, unless a suspension of operations on and the temporary removal of logging equipment from the unit are authorized in writing; PROVIDED, that such authorization will be granted for suitable periods of time on any area and in any season having conditions which substantially impede or preclude logging operations or when necessary to permit the purchaser to obtain a suitable assortment of log sizes for efficient use of his plant facilities. After decision in writing by the Forest Officer in charge that the purchaser has complied with the contract requirements as to specified units, the purchaser shall not be required to do additional work on such units.

No cutting
Before
Payment

9. Except as provided in Section 2(g), no timber shall be cut until paid for, nor removed from place or places agreed upon for scaling until scaled or measured by a Forest Officer. The purchaser shall cut all designated live trees, and shall remove all merchantable material from the sale area. No undesignated live trees shall be cut except those trees unmerchantable because of small size which occur within established cutting areas not designated for tree selection may be cut and removed at the option of the purchaser. The cutting and removal of dead trees shall be optional with the purchaser except as such cutting may be required by the Forest Officer in charge for fire protection and safety.

9(a). *The following dead timber shall be felled concurrently with logging operations: All dead trees over 15 feet in height and over 12 inches in diameter breast height inside the exterior boundaries of cutting units.*

Logging
Methods

10. The methods of logging used by the purchaser, including high lead and skidder logging, shall be such as will permit of leaving uninjured the seed trees and groups of seed trees provided for in Section 4 of this agreement. No unnecessary damage shall be done to young growth or to trees left standing. Undesignated trees which are badly damaged in logging shall be cut if required by the Forest Officer in charge.

Purchaser's operations shall be conducted reasonably to minimize soil erosion. Equipment shall not be operated when ground conditions are such that excessive damage will result. The kinds and intensity of erosion control work shall be kept current immediately preceding expected seasonal periods of precipitation or runoff.

11. On those portions of the sale area on which felling has been or is being done, marked or designated trees left uncut, and unmarked or undesignated trees which contain merchantable material and which are cut, injured through carelessness, or killed by fires which the purchaser, his employees, contractors, or employees of contractors caused, or the origin or spread of which he or they could have prevented unless such cutting, injury or killing involves small amounts of material and in the judgment of the Forest Officer in charge is justified by existing conditions, shall be paid for at double the current price including stumpage and special deposits except slash disposal deposits fixed by the terms of this agreement, for the class of material said trees contain: PROVIDED, that such payment shall not release the purchaser from liability for any damage to the United States other than the value of said trees. Timber wasted in tops, marked or designated timber broken by careless felling, and any other timber merchantable according to the terms of this agreement, which is cut and not removed from any portion of the cutting area when operations on such portion are completed, or before this

agreement expires or is otherwise terminated unless such wastage or nonremoval involves small amounts of material and in the judgment of the Forest Officer is justified by existing conditions, shall be paid for at the current price including stumpage and special deposits for such material. The amounts herein specified shall be regarded as liquidated damages. Unless extension of time is granted by the Forest Supervisor the right, title, and interest to any timber for which payment has been made under the provisions of this section shall revert to the United States without compensation unless it shall have been removed from any portion of the sale area accepted by the Forest Officer in charge within the six months next succeeding the date of such acceptance, or from the remainder of the sale area during the same number of months next succeeding the date of expiration or termination of this agreement.

Stump
Height

12. Stumps shall be cut so as to cause the least practicable waste and not higher than twenty-four (24) inches on the side adjacent to the highest ground for all trees with a diameter of twenty-four (24) inches and under at a point 4-1/2 feet from the ground, and for larger trees the height of the stump on the side adjacent to the highest ground shall not exceed the diameter of the tree at the point of cutting, except when this requirement is impracticable in the judgment of the Forest Officer he may authorize and accept higher stumps: PROVIDED, that all stumps which are not cut in accordance herewith and which should have been so cut in the judgment of the Forest Officer, shall be paid for at the rate of \$0.10 per stump for all stumps less than 24" in diameter and \$0.25 per stump for all stumps 24" and larger in diameter. Such payment shall be regarded as liquidated damages in view of the difficulty of determining the actual damage to the United States through wastage of the quantity and quality of the material involved.

Top
Diameters

13. All trees shall be utilized to as low a diameter in the tops as practicable and to a minimum diameter of six (6) inches when merchantable. The log lengths shall be varied so as to secure the greatest possible utilization of merchantable material.

Slash
Disposal

14. Slash Disposal. The Regional Forester may require that all tops shall be lopped and all brush scattered so as to lie close to the ground and away from standing trees and clumps of reproduction, or any other methods of disposal the estimated cost of which shall not be in excess of this method.

15. Fire Precautions. During the time that this agreement remains in force, the purchaser shall *both independently and in cooperation with the Forest Service* do all in his power to prevent and suppress forest fires on and within the vicinity of the sale area, and shall require his employees, contractors, and employees of contractors to do likewise. Unless prevented by circumstances over which he has no control, the purchaser shall place his employees, contractors,

and employees of contractors at the disposal of any authorized Forest Officer for the purpose of fighting forest fires on or within the general vicinity of the sale areas, with the understanding that unless the fire-fighting services are rendered on the areas embraced in this agreement or on adjacent areas within one mile, payment for such services shall be made by the United States at rates to be determined by the Forest Supervisor, which rates shall not be less than the current rates of pay prevailing in the said National Forest for services of a similar character; PROVIDED, that the maximum expenditure for fire fighting without remuneration in any calendar year will depend upon the following type of fire:

(a) Operation fire. An operations fire is a fire originating in the sale area caused without negligence or fault in purchaser's operations. The purchaser's operations include activities or use of equipment of purchaser, his employees, agents, contractors, sub-contractors, their employees or agents, acting in the course of their employment in operations hereunder (unless acting under the immediate supervision of the Forest Service, as in slash disposal). Maximum expenditures to the purchaser for this type fire will be \$1,000 per operations fire.

(b) Negligently caused fires. The cost of suppressing fires caused by negligence or fault in the purchaser's operations shall be borne by purchaser. Such fires shall include but not be limited to those resulting from smoking by persons engaged in purchaser's operations hereunder during the course of their employment, or rest or lunch periods.

(c) Other fires. For services by purchaser at the request of Forest Service on any fire other than an operations fire or a fire caused by negligence or fault in purchaser's operations, Forest Service shall pay purchaser at rates for fire fighting common in the area.

And, PROVIDED FURTHER, that except in grave emergencies such employees of the purchaser who are needed to prevent unnecessary damage to the purchaser's plant from sudden shut-down will not be called for fire-fighting services.

Release
of Fire
Fighters

16. Except in serious emergencies as determined by the Forest Supervisor, the purchaser shall not be required to furnish more than 100 men for fighting fires outside of the area above specified and any employees furnished shall be relieved from fire fighting on such outside areas as soon as it is practicable for the Forest Supervisor to obtain other labor adequate for the protection of the National Forest.

Fire
Prevention
and
Suppression

17. The purchaser shall abide by all such further rules and orders for the prevention and suppression of fire on sale areas and around logging camps and logging operations as may be currently required by the Regional Forester of logging operators working on the same Division of the Tongass National Forest and using comparable logging methods, facilities, and equipment.

Logging
Improvements

18. Occupancy and Improvements. The purchaser is authorized to build on National Forest land plants, camps, roads, and other improvements necessary in the logging or manufacturing of the timber included in this agreement: (It is contemplated that the purchaser will obtain patent to the site for his main plant under suitable acts permitting the patenting of public lands and that permanent town-sites will be excluded from the National Forest.) PROVIDED, that all such structures and improvements as shall be located and operated subject to such regulations as may be deemed necessary by the Regional Forester for the protection of National Forest interests: PROVIDED FURTHER, that the *Forest Officer in charge* may require before construction work is undertaken for any structures intended for use or occupancy of labor outside of the main plant site and incorporated towns, that plans for such structures shall be submitted to him for approval in writing including such reasonable requirements as he deems necessary as to their design, adequacy and location. The continuance or operation of such improvements on National Forest land after the need for them in connection with purchaser's operations has terminated shall be subject to authorization by permit or easement under United States laws, and unless such authorization is secured all improvements not removed shall become the property of the United States at the expiration of six months from the termination of their actual use in connection with the purchaser's operations under this agreement.

Construction
Timber

19. *Construction Timber.* Purchaser is authorized to cut and use for construction, without charge, construction timber designated by agreement.

Trees and products meeting Utilization Standards used as puncheon, corduroy, or otherwise buried in roadway fill shall not be considered construction timber without charge unless authorized in writing by Forest Service.

Sanitation

20. The purchaser shall keep all logging camps, mills, and other structures used in connection with this sale and the ground in their vicinity, in a clean sanitary condition, and rubbish shall be removed and burned or buried. When camps or other establishments are moved from one location to another or abandoned, the purchaser shall burn or otherwise effectively dispose of all debris and abandoned structures.

All camp buildings and structures used in connection with this sale shall be located and operated as may be required by the Forest Officer in charge to prevent the pollution of the water in any stream. Outhouses, toilets, and garbage pits shall be constructed and maintained so as to prevent, so far as is possible, the breeding of flies or the development of unsanitary conditions.

21(a) Salmon Protection. Purchaser's operations shall not be permitted to interfere with the passage of salmon to their spawning grounds or to injure the spawning grounds in any way. Any logging debris accidentally or necessarily thrown into any stream used by salmon shall be removed therefrom as soon as practicable and in any event before the logging equipment is moved from that portion of the sale area.

21(b) Bald Eagle Protection. In compliance with the "Bald Eagle Act" of June 8, 1940 (16 USC 668), and subject to Forest Service policy exceptions, purchaser shall not cut trees, or areas, designated by the Forest Service as containing an eagle nest, and will not willfully molest or disturb any American bald eagle, nest, or eggs thereof.

22. The purchaser agrees to exert every reasonable effort to obtain the installation of a well balanced forest products industry for utilization of the various kinds of primary forest products developed for cutting in the sale area. It is contemplated that provision will be made for such processing of primary forest products as is proven feasible and desirable in connection with other comparable pulp and paper manufacturing enterprises in Alaska, but the purchaser shall not be obligated to make any plant installation or contractual arrangement which would impair the efficient supply of pulptimber to his pulp enterprise.

23. So far as it is practicable to do so labor for the conduct of logging operations, mills, and manufacturing plants conducted by the purchaser, its affiliates, subsidiaries, or contractors within Pulptimber Allotments E, F, and G will be recruited from residents of Southeast Alaska.

24. At all times when logging operations are in progress the purchaser shall have in Alaska a representative in general charge of such operations, who shall be authorized to receive, on behalf of the purchaser, any or all notices and instructions in regard to work under this agreement given by Forest Officers, and to take such action thereon as is required by the terms of this agreement. On each logging operation, or group of operations placing logs in the water at points not more than 5 miles apart, the purchaser shall have on the ground a representative who will be authorized to receive and to take the required action on any and all notices and instructions given him, under the terms of this agreement, by the Forest Officer in charge.

25. Complaints by the purchaser as to any action taken by a Forest Officer respecting this agreement shall not be considered unless made in writing within sixty (60) days of such action to the Forest Officer having jurisdiction. The decision of the Secretary of Agriculture shall be final in the interpretation of the regulations and provisions governing the sale, cutting, and removal of the timber covered by this agreement.

Suspension
of
Operations

26. The Regional Forester, *or his delegated representative*, shall notify the purchaser in writing of any violation of the terms of this agreement on any logging unit or units within the sale area and allow a reasonable and definite period of time to comply with such terms. If satisfactory compliance is not made within the time allowed, the Regional Forester may suspend, by notice in writing or other means of transmitting written messages, all operations, including the removal of scaled or measured timber, on such unit or units, such suspension to continue in effect until the purchaser complies with such terms in a manner satisfactory to the Regional Forester.

Inspection
of
Records

27. All records pertaining to the purchaser's logging operations in Alaska, including the production and sale of all primary forest products, shall be open to inspection at any time by a qualified logging engineer or accountant employed by the Forest Service and designated by the Regional Forester to make such inspection with the understanding that the information obtained shall be regarded as confidential. During the period from January 1 to July 1, 1964, and for similar periods at subsequent 5-year intervals all records of the purchaser's manufacturing activities in connection with timber from this sale may be similarly inspected to the extent necessary for redetermination of stumpage prices and determination of the percentage rate specified in Section 1(d) of this agreement.

"Officer
in
Charge"
Defined

28. The term "Officer in Charge" whenever used in this agreement signifies the Officer of the Forest Service who shall be designated by the proper Forest Supervisor to supervise the timber operations in this sale.

Act of
March 4,
1909

29. No member of or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit. (41 U.S.C. Sec. 22, and 18 U.S.C. Sec. 199).

Anti
discrim-
ination

30. *Anti-discrimination. Purchaser will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. Purchaser will, in all solicitations or advertisements for employees placed by or on behalf of purchaser, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. (Executive Order No. 11246, of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967.)*

31. This agreement may be transferred to the successor in interest of the purchaser provided the transferee is acceptable to the United States as a purchaser of timber under the conditions and requirements then in effect for similar timber sales and provided the transfer is approved by the Forest Officer who approved this agreement, or by his successor, authorized deputy, or superior officer.

Preliminary
Award

32. This agreement is entered into in accordance with the public sale of the timber described herein on August 2, 1948, and the preliminary award granted purchaser on said date including extensions thereof and modification as stated herein.

Authority
to
Modify

33. The conditions of the sale are completely set forth in this agreement, and none of its terms can be varied or modified except in writing by the Forest Officer approving the agreement, or his successor or superior officer, and in accordance with the regulations of the Secretary of Agriculture.

34. And as a further guarantee of a faithful performance of the conditions of this agreement, the purchaser delivers herewith a bond in the sum of fifty thousand dollars (\$50,000) to cover the period prior to July 1, 1964, and further agrees to deliver to the Regional Forester at least ten days before June 30, 1964, the date the bond delivered herewith is to expire, and likewise at least ten days before the date of expiration of any other bond hereafter delivered in connection with the sale a new bond in such sum, and under such conditions as the Regional Forester may require, but not to exceed \$50,000 in amount. The purchaser further agrees that upon failure on his part to fulfill all and singular the conditions and requirements herein set forth or made a part hereof, all moneys paid under this agreement may be retained by the United States to be applied to the satisfaction of his obligations assumed hereunder without prejudice whatever to any other rights and remedies of the United States. The purchaser further agrees that should the sureties on the bond delivered herewith or on any other bond delivered hereafter in connection with this sale become unsatisfactory to the Officer approving this agreement or his successor, the purchaser shall within thirty (30) days of receipt of demand furnish a new bond with sureties satisfactory to the approving officer.

35. *Transportation Facilities and Authorization.* In accordance with Section 18, purchaser is authorized to construct and maintain roads, bridges, and other transportation facilities, as needed for harvesting timber included in this contract, on National Forest and other lands where Forest Service has such authority. As used in this contract "construct" includes "reconstruct".

35(a). Location and construction of such Specified Roads shall be in accordance with 35(b). Unless otherwise provided herein, construction may be progressive during this contract. Maintenance shall be governed by specification 53, Road Maintenance, as established by the Regional Forester and Section 18. The location and clearing widths of all Temporary Roads or facilities shall be agreed to before construction is started. "Temporary Roads" are roads other than Specified Roads which are constructed by purchaser for the purpose of harvesting timber included in this contract.

35(b). Specified Roads. "Specified Roads" are roads, including related transportation facilities and appurtenances, shown on 5-year operating period map and listed in Table A1, attached hereto and made a part hereof for which purchaser shall be given purchaser credit when constructed. Purchaser shall construct Specified Roads used under this contract. Construction initiated by purchaser on any such Specified Road shall be completed to an agreed terminus that meets purchaser's needs and prevents unnecessary injury to National Forest resources. The construction to such terminus shall be in full accordance with plans, specifications, designs, and drawings developed under 35(c), and the regulations as established by the Regional Forester pursuant to Section 18, except for agreed adjustments needed to accommodate such terminus. The cost, as estimated by Forest Service for the portion constructed, shall be separately recorded as a segment in a revised Table A2.

A Temporary Road shall not be constructed substantially on the location for a Specified Road, except by agreement.

In event of agreed addition or deletion of those roads shown on 5-year operating period map and listed in Table A1, a revised table designated A1-1, A1-2, etc., shall supersede any prior table as A1 when it is dated and signed by purchaser and Forest Supervisor.

In event of agreed substitution or revision of construction design, specifications, or performance responsibility under contract Sections 35(c), 35(h), and 35(i), a revised table designated A2-1, A2-2, etc., shall supersede any prior table as A2 when it is dated and signed by purchaser and Forest Supervisor.

35(c). Engineering. Survey and design for Specified Roads shall be performed by the Forest Service unless otherwise specified in A1. Survey, design, and construction staking of Specified Roads to be engineered by purchaser shall be performed by purchaser in accordance with specifications supplied by the Regional Forester. Based upon the quantities developed by such design as approved by the Forest Service, the estimated costs and Purchaser Credit Limit stated in A2 shall be revised by the Forest Service.

On those roads for which the design is completed by Forest Service, the design quantities shall be used as the basis for revising estimated costs and Purchaser Credit Limit stated in A2.

The methods of computing such revised costs shall be consistent with the methods that would have been used had the engineering been performed prior to the beginning of the 5-year operating period.

On or before January 1 of each year, at the time of submission of the annual logging plan, the purchaser will furnish the Forest Service with a tentative schedule for those roads to be constructed for the following year's logging operations. If the purchaser proposes a change in the construction schedule that results in less than one year lead time for survey and design, the purchaser shall be responsible for the survey and design unless otherwise agreed.

35(d). *Estimated Costs.* Estimated costs by construction phases for specific roads to be constructed during each 5-year operating period are stated by segments in A2. Such costs are subject to revision under 2(b), 2(c), 35(b), 35(c), 35(f), 35(g), 35(h), and 35(i).

Appropriately adjusted costs shall be made a part of a revised A2 which will be designated A2-1, A2-2, etc. The revised A2 shall supersede any prior A2 herein when it is dated and signed by purchaser and Forest Supervisor.

35(e). *Difference in Rock Costs.* If there is advance written agreement on changes in source, average haul mileage, type, or dimensions shown on drawings, affecting cost estimates for embankment rock from "designated sources", surface rock, or rock riprap, A2 will be revised to reflect these changes. Forest Service will prepare revised cost estimate which will be the sum of:

(1) unit rates consistent with the Table of Unit Costs times the estimated quantities used in computation of cost estimates in the most recent A2, (2) unit rates in current use times the amounts by which the revised quantity estimates exceed estimated quantities used to compute the most recent A2, (3) the estimated cost of any development work performed at specified sources abandoned as unsatisfactory, at rates consistent with the Table of Unit Costs in effect at the time the work was done.

35(f). *Difference in Culvert Installation.* If the actual approved amount, size or type of culvert or drainage accessories installed hereunder differ from those estimated in drawings and specifications under 35(b), the Table of Unit Costs shall be revised to reflect these changes and appropriate changes made to A2. The revised cost estimate will be prepared by Forest Service and will be the sum of: (1) unit rates in the current Table of Unit Costs times the revised estimated amounts for those sizes or types listed in the Table of Unit Costs, and (2) unit rates in current use times the revised estimated amounts of sizes or types not listed in the Table of Unit Costs.

35(g). *Cost Adjustment for Physical Change.* The estimated costs in A2 shall be revised if prior to acceptance, a major physical change, caused by a single event and not due to negligence of purchaser, results in additional work by purchaser involving an additional estimated cost of more than \$3,000. Such costs shall include the cumulative estimated costs of repairing damage from slides, washouts, landslips, fire, etc., caused by said event. Drawings and specifications shall be revised when necessary to meet the new conditions. Such revised drawings and specifications, together with the estimated cost of work abandoned, shall be the basis for revised cost estimates.

The difference in estimated quantities for the portion of the road affected by physical change shall be determined by Forest Service by comparing the most recent previous quantity estimates with the total of quantity estimates for construction performed prior to physical change plus quantity estimates for construction to be performed following physical change. Where the quantity difference is an increase, such increase times the current unit rate shall constitute the increase in cost estimate to be added to A2. When the quantity difference is a decrease, such decrease times the rate or rates used in preparing the most recent previous cost estimate for the road portion shall constitute the decrease in cost estimate to be subtracted from A2.

35(h). Design Change. If purchaser and Forest Service agree in writing on a design change, appropriate and related changes shall be made in drawings and (uniform and/or supplemental) specifications and estimated costs shall be revised to reflect such design change. A design change is a change of other than a minor nature in location; road cross section; quantities of unsuitable or excess material to be removed; or structures, other than culverts, described in drawings and specifications. Changes of a minor nature are those such as in alignment normally considered as necessary to maintain earthwork quantities substantially as designed. The difference in estimated quantities for the portion of the road affected by each design change shall be determined by Forest Service by comparing the most recent previous quantity estimates with the total of quantity estimates for the proposed design change, plus quantity estimates for construction performed but abandoned because of design change. Where the quantity difference is an increase, such increase times the current unit rate shall constitute the increase in cost estimate to be added to A2. Where the quantity difference is a decrease, such decrease times the rate or rates used in preparing the most recent previous cost estimate for the road portion shall constitute the decrease in cost estimate to be subtracted from A2. A2 shall be revised periodically to reflect the total change in cost resulting from design changes effected during the period. If a design change required adjustments in rock costs or culvert installation such adjustments will be made in accordance with 35(e) or 35(f).

35(i). Alternate Facilities. If, during the 5-year operating period, roads needed for the removal of timber included in this contract differ substantially from surveyed and designed Specified Roads, other roads may be added to A1. The road routing, location, design, and needed easements shall be such as will make other roads acceptable as parts of the National Forest transportation system. Survey, design, and construction staking for such other roads shall be provided by purchaser.

Based on design quantities from such engineering, Forest Service shall estimate construction costs of alternate facilities using methods consistent with those used in the original computation of A2. Purchaser Credit Limit for acceptable alternate facilities shall not exceed the estimated costs of facilities based on survey and design estimates, listed in A2 which purchaser does not construct except that Purchaser Credit Limit may be adjusted as described in 35(b), 35(c), 35(d), 35(f), 35(g), and 35(h).

35(j). *Purchaser Credit Computation.* Forest Service shall make timely estimates of purchaser's progress in Specified Road construction. On the basis of such progress estimates and the cost estimates in A2, Forest Service shall credit purchaser's Timber Sale Account each month as such work proceeds. Materials furnished and delivered by purchaser shall be included in estimating work progress.

Such crediting of purchaser's Timber Sale Account shall be at 95 percent of the estimate of cost of work accomplished until the project segment listed in A2 is accepted as completed or is abandoned under 35(i). At such time, purchaser's timber sale account shall receive full credit up to Purchaser Credit Limit.

35(k). *Control of Erosion After Logging.* After logging operations have been completed on any unit of the sale area, necessary work to prevent undue erosion on all roads shall be performed by the purchaser as follows:

(1). On roads that are not to be kept on a permanent basis, obliteration shall be in accordance with Section 18 (and such regulations as established by the Regional Forester).

(2). On Specified Roads, all work necessary to restore culverts, ditches, and other drainage structures to standard agreed on for that road in accordance with Section 35(b).

(3). On cut and fill slopes, waste and spoil areas susceptible to erosion on or along roads and skid trails constructed or used by the purchaser, purchaser shall revegetate all such areas by seeding with grass. Revegetation work may include fertilization.

35(l). *Use of Partially Constructed Road.* Portions of Specified Roads shall be Substantially Completed prior to their use for hauling timber from each established landing, except that purchaser may be relieved in writing of this requirement if there is justification under existing conditions. When necessary to facilitate construction and protect bridges and roads from damage, timber felled in construction and timber logged directly to the road from areas immediately adjacent thereto may be hauled before

road construction is Substantially Completed. Such hauling shall be confined to periods when abnormal soil, erosion and damage to National Forest lands will not result.

"Substantially Completed" means completion of grading and installation of drainage structures so they will function effectively.

Unless agreed otherwise, specified reconstruction shall be completed on any portion of road prior to hauling on that portion.

35(m). Designated Sources. Those sources of local material shown on the drawings and described in the pit development plans are "Designated Sources". All other sources shall be considered undesignated. The Forest Service assumes responsibility for the quality and quantity of material in the Designated Source. It is agreed that it is not feasible to determine from samples the limit for an entire deposit, and that variations in materials shall be considered as usual and are to be expected.

The purchaser shall utilize the material in the Designated Source to the fullest extent possible. Should the "Designated Source", due to causes beyond the control of the purchaser, contain insufficient acceptable material, the Forest Service shall provide another source with an equitable adjustment in accordance with 35(e).

The purchaser shall promptly and before such conditions are disturbed, notify the Forest Service of the unsuitability of the "Designated Source".

Signed in triplicate this 26th day of July, 1951.

(Corporate Seal)

Ketchikan Pulp & Paper Company

By H. L. Linnco

Its President

Witnesses:

Attest

George V. Powell
Secretary

Wm. H. Ramsey
Forest St. Evans

Approved at Washington, DC, under the
above conditions, August 20, 1951.

ASG

[Signature]
Acting Chief, Forest Service

[Signature]

OPERATING GUIDELINES
FOR TIMBER SALE
LAYOUT

KPC LONG-TERM CONTRACT

1979 - 1984

OPERATING PERIOD

Recommended By: *C. L. Wendisch*
Timber Program Manager

7/1/76
Date

Approved By: *J. S. Watson*
Forest Supervisor

9/15/76
Date

TABLE of CONTENTS

	Page
I. Timber.....	1
II. Recreation.....	3
III. Visual Resource.....	4
IV. Fish Stream Habitat.....	5
V. Log Transfer and Raft Storage.....	7
VI. Soil and Watershed.....	9
VII. Wildlife.....	10

TIMBER

1. The timber management objectives are:

Develop and maintain healthy, vigorous commercial forests by harvesting overmature and decadent stands prior to the harvest of younger stands of timber.

--Establish and maintain a balanced distribution of age classes by area and productive capability.

--Use regeneration systems which will result in adequate natural regeneration.

--Enhance the quality and quantity of timber production by rotation age.

--Achieve and maintain optimum productivity in all managed stands by:

- a. Minimizing adverse impacts from diseases.
- b. Obtaining and maintaining optimum stocking in stands that are under rotation age through cultural treatment.
- c. Reduce forest losses from insects to levels commensurate with resource values involved.

2. The transportation system will be planned to harvest all the commercial forest land in the given area, even though all CFL areas will not be harvested by one entry. The only roads that will be built will be those that are needed to harvest the approved units.
3. Logging systems used must be compatible with silvicultural and other resource objectives.
4. Even-aged management by clearcutting will be the preferred system for regeneration of the hemlock-Sitka spruce type.
5. Uncut stands of commercial timber will be planned so they are suitable for subsequent commercial logging.
6. Windfirmness will be a major consideration in unit boundary location.

(1)

7. Factors to consider when planning entries adjacent to existing cutover areas are:
 1. Effect of new logging activities on reproduction in existing cutover area.
 2. Visual impact of new clearcut in combination with existing clearcut. In areas of high visual sensitivity previous cutting areas should be "greened up" before second entry planned.
 3. Attainment of a balanced distribution of age classes of good and poor sites.
 4. Soundness of stump anchors in adjacent clearcut.
 5. The impact on wildlife in key habitat areas.

The time range for these factors can vary from five to fifty years depending on specific site conditions. Therefore, whenever clearcutting is planned adjacent to less than pole-sized timber the reasons will be documented in the E.A.R. or E.I.S.

8. For additional information refer to FSM 2471 R-10 Supplement #126.

RECREATION

There is a wide variety of existing and potential recreational opportunities which make up the recreation resource of the KPC sale area. Much of the Ketchikan Pulp Company long-term sale lies within the Prince of Wales Planning Unit and is covered by Management Units of the Tongass Land Use Plan. Generally the recreation guidelines contained in this document give direction for protection of this resource.

Additional direction is:

1. Each recreation cabin and inventoried cabin site will be identified on the visual resource management overlay. The landscape architect will analyze each cabin and assign landscape management units commensurate with the appropriate sensitivity level.
2. Provide access free of logging debris along those lakes and streams identified on the 1" = 1 mile recreation overlay.
3. Proposed roads which will be retained for public travel should be located so they provide the user with a varied and interesting experience.
4. Where appropriated funds are available, provide overnight parking along roads which will remain open to public travel.
5. Known historical and archeological sites are identified on the overlays and will be protected in accordance with the Antiquities Act and its related legislation and Executive Orders.
6. Plan activities so that anchorages identified on overlays are not exposed to the wind.
7. Sensitive areas such as streamsides, lakeshores, saltwater shorelines, and roadsides identified on visual resource overlays will be managed in accordance with landscape management units assigned to them.

FISH STREAM HABITAT

The following are operating guidelines for timber harvest planning involving fish streams in the sale area. Guides to minimize sedimentation are covered in the Watershed Requirements.

1. When laying out units adjacent to designated fish streams use the stream as a yarding divide to prevent damage to streambank and introduction of debris into stream.
2. Where necessary to yard across a designated fish stream, logs must be fully suspended to protect streambanks and streambank vegetation.
3. Locate and design roads to eliminate the introduction of construction debris into fish streams.
4. Streams not shown on the overlays or in the Alaska Department of Fish & Game catalog but which are affected in any way by logging or construction activities should be reported to the Area Biologist with information of fish species, whether adult or juvenile, water temperature, and date of observations. Such streams will receive the protection outlined in these guidelines.
5. Drainage structures will be located and installed to minimize impact on all resources. All bridges will be designed to prevent spillage of road material into the stream. Culverts on designated fish streams will be designed to insure fish passage at normal streamflows. Normal flow will be based on a flow duration analysis and defined as those flows which occur between 10 and 80 percent of the time on the duration curve.
6. Roads and rock pits will be located and designed to minimize introduction of silt and other impacts to streams.
7. Streams will not be diverted from their natural channel to accommodate road location without recommendations of the area hydrologist and fishery biologist and approval of the Forest Supervisor.
8. Temperature-sensitive streams are identified on the overlays and have the following requirements for timber harvest along their banks:
 - a. No more than 25 percent of the streamside overstory canopy should be removed in the initial entry.

- b. Where timber is harvested near streambanks, no more than 20 chains adjacent to the streams should be cut on the N, NE, E, and SE side of the stream and 10 chains on the S, SW, W and NW side.
- c. Protect the brush and understory, including shrub trees, adjacent to the stream during timber harvest operations.
- d. Normally, streams shown on the overlays require tree cover to provide necessary shading from direct sunlight; however, streams not shown on the base maps or overlays, but which are tributaries to streams in the above category, generally are small and may be shaded adequately by streamside brush, grass, or high banks (topographic shading). In these cases it may not be necessary to avoid cutting of timber adjacent to these streams as outlined in guideline "b" above.

(6)

- A. Those people responsible for selecting transfer sites, booming grounds, and log storage areas should try to:
 - 1. Maximize the distance between the mouths and intertidal channels of anadromous fish streams and the sites.
 - 2. Maximize the distance between tide flats and subtidal beds of aquatic vegetation and the sites.
 - 3. Use the steepest shores having the least intertidal and subtidal zone.
- B. Other objectives relate to the reduction of certain activities in conjunction with transfer sites. These objectives include efforts to:
 - 1. Minimize disturbance of the shoreline as a result of clearing, road building, and other activities that might produce silt or otherwise disrupt the estuarine environment.
 - 2. Minimize storage time for rafted logs before transport to the mill.
 - 3. Minimize the number of active transfer sites and log storage areas in any given bay or bay complex.
 - 4. Minimize the filling of intertidal and subtidal areas for the construction of log transfer sites, fuel transfer facilities, equipment loading ramps, etc.
 - 5. Minimize the use of intertidal areas as a source of borrow.
 - 6. Minimize interference with other established uses such as commercial and sport fishing, hunting and anchorages for commercial and recreational boats.
- C. With regard to impact on fishery resources in general, selecting the following alternatives will probably serve to minimize adverse effects:
 - 1. Whenever possible locate sites outside bays, along straits and channels.

2. Locate transfer sites in deep bays rather than in shallow bays. Select bays without sills or other natural restrictions to tidal exchange.
3. Locate transfer sites near mouths of bays rather than at heads of bays unless the environment at the mouth of the particular bay in question has some special significance.
4. Use the deepest water possible for booming grounds and log raft storage areas.
5. Select sites that accommodate future timber development without requiring continual relocation.

If a choice must be made, protect fishery resources in the order of their importance. For example, protecting anadromous fish runs and streams has a higher priority than protecting clams and clam beds, because salmon are more important economically at this time. Such trade-offs may change from time to time as local and regional needs change. Usually, when conflicts arise that require trade-offs between fishery resources, decisions regarding resource values should be solicited from biologists after an on-site examination of the particular situation.

1/ Log transfer and Storage Area Guidelines are adopted from:

Department of Commerce
National Oceanic and Atmospheric Administration

National Marine Fisheries
Juneau, Alaska

SOILS AND WATERSHED

1. To maintain soil productivity and lessen sediments to streams from yarding activities, soil disturbance should not exceed 30 percent. Exposed bare mineral soil or rock should not exceed 10 percent of a unit, and these areas must be small, scattered, and discontinuous sites which are separated from live stream or river channels by areas with undisturbed surface organic matter layers. The other 20 percent disturbance may consist of a mulch condition which could include a mixture of organic and mineral horizons or a mixture of organic horizons.
2. Units, regardless of soil types, may not be selected for tractor yarding unless field review shows that the maximum ground disturbance in recommendation one will not be exceeded. Approved units may not exceed 10 percent slope gradients.
3. To maintain soil cover and minimize slope failure, partial or full suspension should be obtained when yarding downhill on slopes between 60 and 75 percent (31 to 37 degrees).
4. On slopes 67 percent or greater, an investigation will be made by the watershed, soils, or materials specialists to determine feasibility of logging. If logging is approved on slopes 75 percent or greater, full suspension will be required for nearly the entire length of the external yarding distance. See FSM 2470.
5. When logging units, where V-notches are present, adhere to the recommendations and hazard ratings in the paper titled: The Development of a V-notch Classification System for Southeastern Alaska, to minimize soil disturbance and mass soil movement.

WILDLIFE

1. The following guidelines are primarily for protection or enhancement of deer winter range and are based on a series of wildlife overlays in the Ketchikan Area Wildlife Atlas available at the Ketchikan Area Office.

Black - These are areas that have been heavily cut. Emphasize thinning in the second growth, but no clearcutting will be allowed in the remaining old growth during the 1979-84 operating period.

Red --Significant wildlife areas such as
--specific key winter deer range
--escape cover along salmon stream
--estuarine areas for waterfowl, big game,
 furbearers, and nongame species
--small islands under 50 acres

Any activity within these areas during the 1979-84 operating period will be designed to maintain or improve wildlife habitat. Such activity will be based on recommendations of the Forest Service biologist.

Blue - Beach areas adjacent to F4 ecosystems are considered to be the best potential winter range for deer in southeast Alaska under average winter conditions.

1. Beach zone is one-quarter mile deep.
2. No clearcut should cover more than one-eighth mile width of the beach zone defined above or extend completely to the beach. Generally, a 100-200 foot buffer is required between the clearcut and the beach. Guidelines to minimize blowdown should be applied. Distances between cuts should be at least one-half mile unless salvage needs dictate otherwise.

Green - Beach areas adjacent to F1 ecosystems:

1. Beach zone is one-quarter mile deep.
2. No clearcut should cover more than one-quarter mile width of the beach zone defined above or extend completely to the beach. Generally, a 100-200 foot buffer is required between the clearcut and the beach. Guidelines to minimize blowdown should be applied. Distances between cuts should be at least one-half mile unless salvage needs dictate otherwise.

Remaining (uncolored) - Beach front areas of general but unknown wildlife importance.

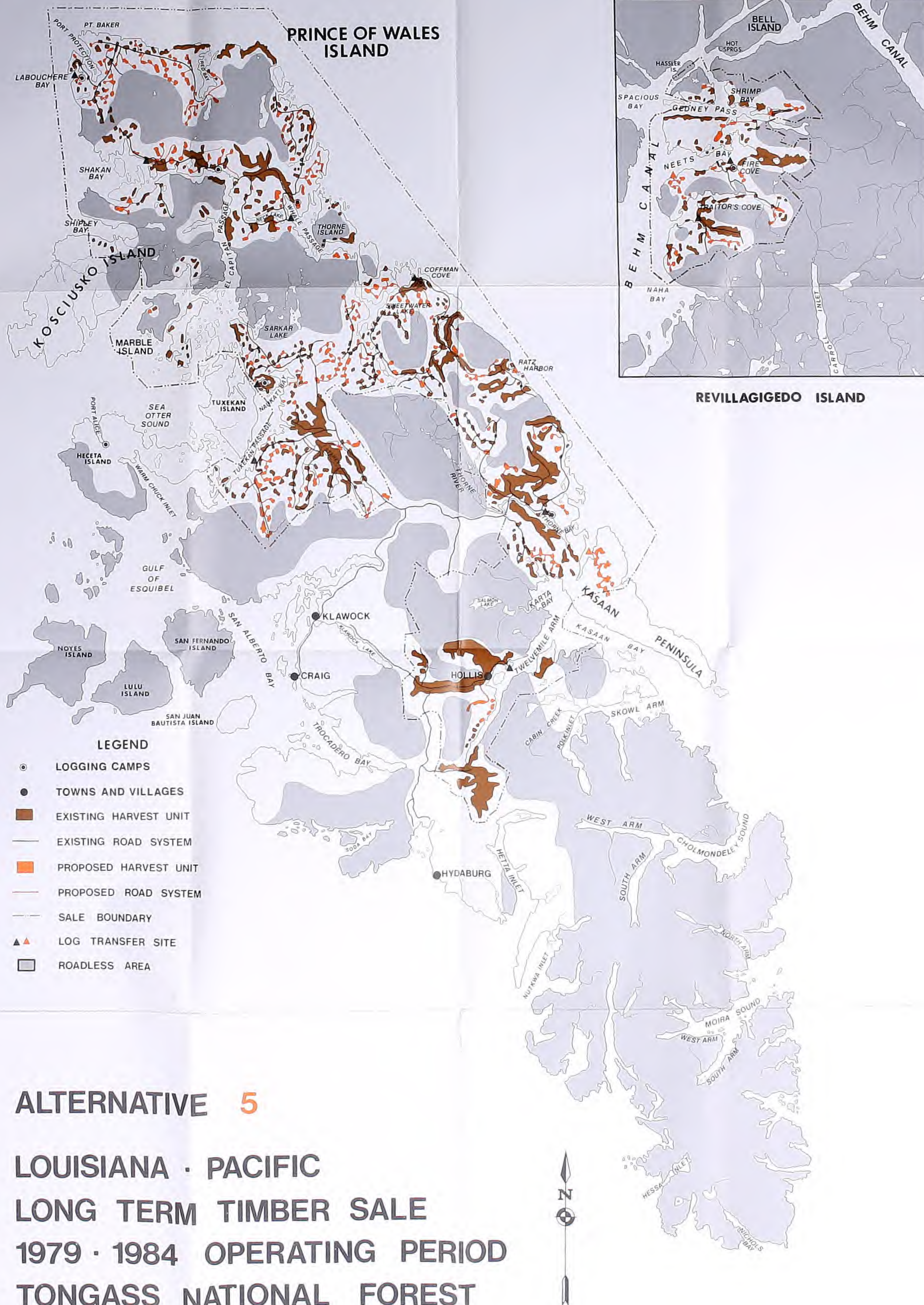
1. Clearcut size should be as small as practical. Average size should be 25 acres.
2. Leave areas should be as large as adjacent cutover areas.

Other wildlife requirement not necessarily species oriented

1. On catalogued salmon streams, no more than 25 percent of the streamside timber will be harvested along the first one-half mile of the stream from saltwater.
2. Beaver ponds need protection by limiting cutting to removal of maximum of one-half shoreline for each entry.
3. Some importance has been given to protection of the borders of muskegs, possibly by leaving a strip of timber. Protection of these borders should be a standard practice in areas of few muskegs. The result will be more diversified habitat with increased edge within a given area.
4. Eagle nest trees, regardless of whether currently active, are to be protected. Roads, cutting or other disturbance activities will be kept a minimum of five chains away to insure a windfirm stand around the nest. Refer to FSM 2613.01a R10 Supplement #26 and FSM 2633 Supplement #14.
5. Existing camps and facilities should be utilized where practicable, and new developments in high wildlife use areas should be avoided.
6. Roads should be located to minimize conflicts with high wildlife use areas and should be routed outside deferred cutting areas where practicable.

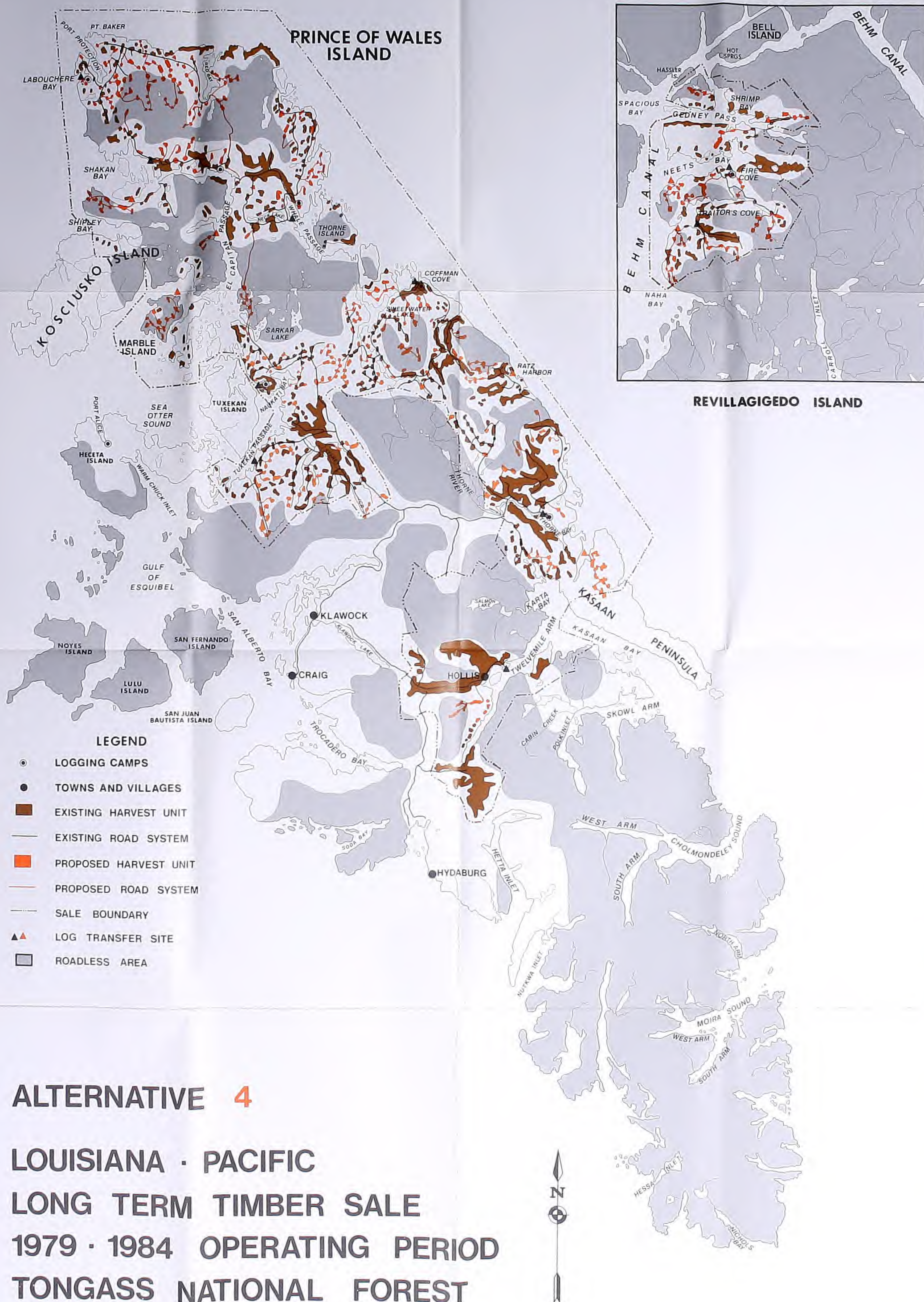
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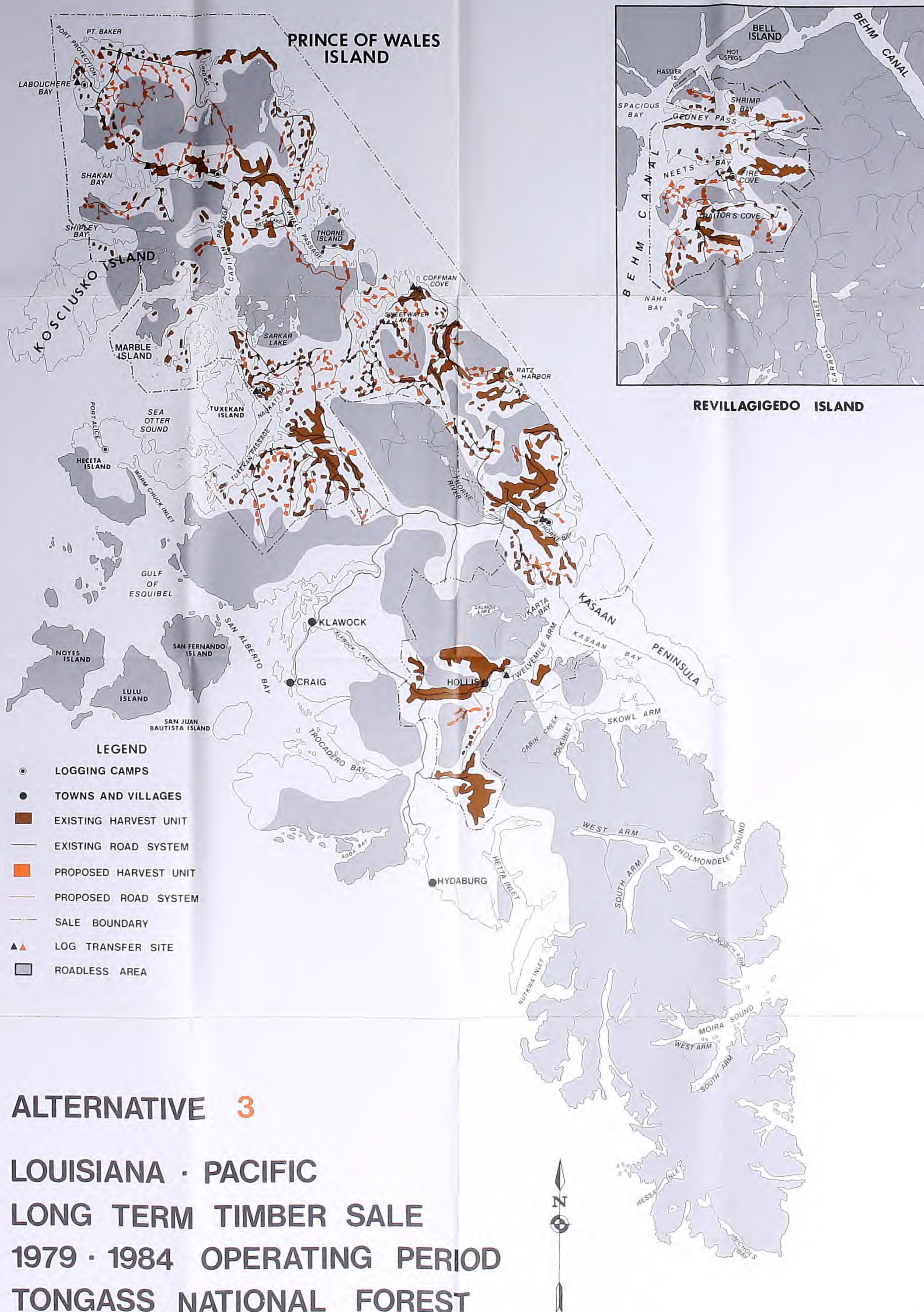
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PACIFIC

TIMBER SALE

OPERATING PERIOD

NATIONAL FOREST



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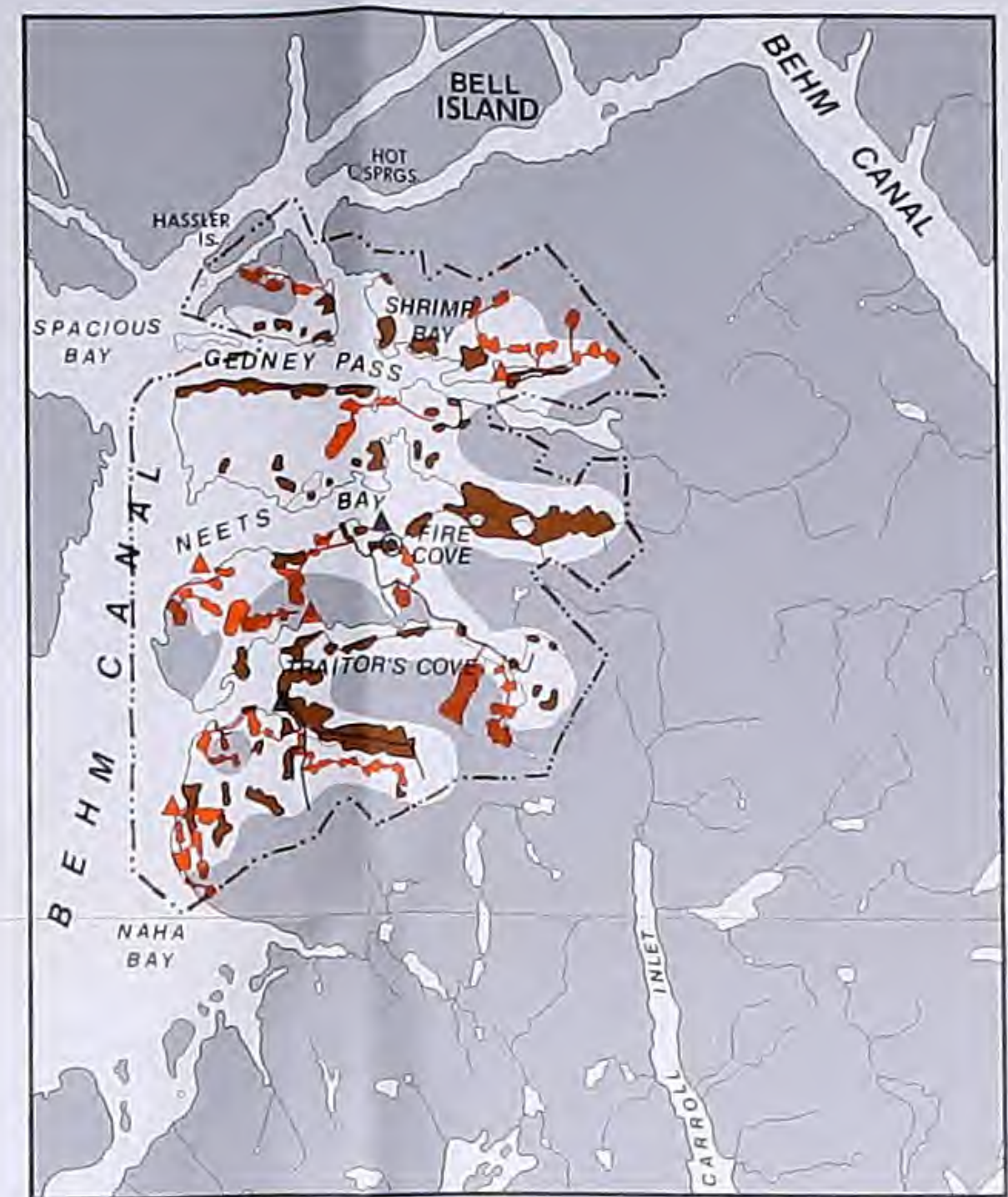
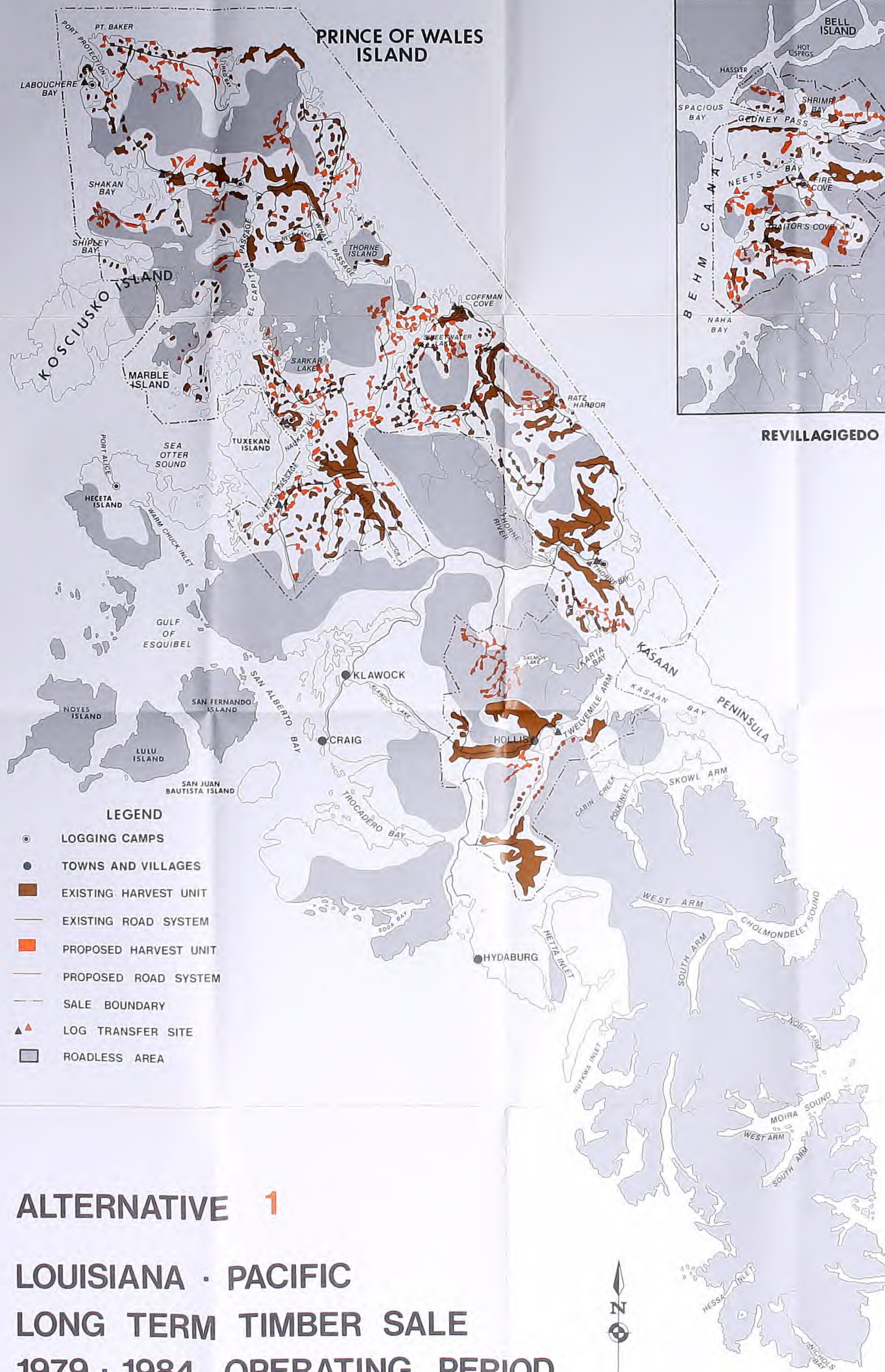
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**PACIFIC
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ALTERNATIVE 1

LOUISIANA · PACIFIC
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